RC
1042
.L66
1994b

S. Department
Transportation

ıtional Highway
ıffic Safety
Administsration

DOT HS **808 219**

December 1994

Final Report

Final Report of a Non-Deformable Crabbed Impactor into a 1988 Ford Taurus 4-Door Sedan in Support of CRASH3 Damage Algorithm Reformulation

This document is availalbe to the public from the National Technical Information Service, Springfield, Virginia 22161

Notice

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

RC
1042
.L66
1994b
c.1

Technical Report Documentation Page

1. Report No.
DOT HS 808 219

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle

Final Report of a Non-Deformable Crabbed Impactor
Into a 1988 Ford Taurus 4-door sedan in Support of
CRASH3 Damage Algorithm Reformulation

5. Report Date

December 1994

6. Performing Organization Code

7. Author(s)

K. W. Looker, Project Engineer, TRC

8. Performing Organization Report No.
941007

9. Performing Organization Name and Address

National Highway Traffic Safety Admin.
Vehicle Research and Test Center
P. O. Box 37
East Liberty, OH 43319

10. Work Unit No. (TRAIS)

11. Contract or Grant No.
DTNH22-88-C-07292

12. Sponsoring Agency Name and Address

U. S. Department of Transportation
National Highway Traffic Safety Administration
400 Seventh St., S.W.
Washington, DC 20590

13. Type of Report and Period Covered

Final Report
Oct. - Dec. 1994

14. Sponsoring agency Code

DOT/NHTSA/VRTC

15. Supplemental Notes

16. Abstract

This test was conducted for research and development in support of the CRASH3 damage algorithm reformulation. This test was conducted on a 1988 Ford Taurus 4-door sedan, VIN 1FABP5240SA215297, at Transportation Research Center Inc. on October 7, 1994. The impact speed was 54.1 kph.

Maximum Cumulative Crush:

At Vehicle Axle Height:	235	mm
At Vehicle H-Point Height:	274	mm
At Vehicle Mid Door Height:	256	mm
At Vehicle Window Sill Height	203	mm
At Vehicle Window Top Height:	-56	mm

17. Key Words

Non-Deformable Crabbed Impactor
1988 Ford Taurus 4-door sedan
CRASH3 Damage Algorithm Reformulation

18. Distribution Statement

Document is available to the
public through the National
Technical Information Service
Springfield, Virginia 22161

19. Security Classif. (of this report)
Unclassified

20. Security Classif. (of this page)
Unclassified

21. Number of Pages
109

22. Price

Form DOT F 1700.0 (8-72) Reproduction of completed page authorized

DEPARTMENT OF TRANSPORTATION
MAY 12 1998
NASSIF BRANCH LIBRARY

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

LENGTH

Symbol	When You Know	Multiply by	To Find	Symbol
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km

AREA

Symbol	When You Know	Multiply by	To Find	Symbol
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha

MASS (weight)

Symbol	When You Know	Multiply by	To Find	Symbol
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t

VOLUME

Symbol	When You Know	Multiply by	To Find	Symbol
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3

TEMPERATURE (exact)

Symbol	When You Know	Multiply by	To Find	Symbol
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

---

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures. Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

LENGTH

Symbol	When You Know	Multiply by	To Find	Symbol
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

AREA

Symbol	When You Know	Multiply by	To Find	Symbol
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	

MASS (weight)

Symbol	When You Know	Multiply by	To Find	Symbol
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	

VOLUME

Symbol	When You Know	Multiply by	To Find	Symbol
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3

TEMPERATURE (exact)

Symbol	When You Know	Multiply by	To Find	Symbol
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

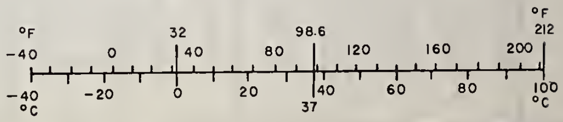


Table of Contents

Section	Title	Page
1.0	Purpose and Test Procedure	1-1
2.0	Vehicle and Test Data	2-1
3.0	Test Summary	3-1
Appendix A	Photographs	A-1
Appendix B	Data Plots	B-1
Appendix C	Miscellaneous Test Information	C-1

List of Tables

Number	Description	Page
1	Test Vehicle Information	2-2
2	Impactor Information	2-5
3	Profile Measurements at Vehicle Axle Height	2-6
4	Profile Measurements at Vehicle H-Point Height	2-8
5	Profile Measurements at Vehicle Mid-Door Height	2-10
6	Profile Measurements At Vehicle Window Sill Height	2-12
7	Profile Measurements at Vehicle Window Top Height	2-14
8	Vehicle Accelerometer Locations and Data Summary	2-17
9	Crabbed Impactor Accelerometer Locations and Data Summary	2-19
10	Camera Information	2-21
11	Test Conditions	3-2
12	Vehicle Crush at Axle Height	3-3
13	Vehicle Crush at H-Point Height	3-5
14	Vehicle Crush at Mid Door Height	3-7
15	Vehicle Crush at Window Sill Height	3-9
16	Vehicle Crush at Window Top Height	3-11

List of Figures

Number	Description	Page
1	Vehicle Accelerometer Placement	2-16
2	Crabbed Impactor Accelerometer Placement	2-18
3	Camera Positions	2-20
4	Vehicle Crush Profile at Axle Height	3-4
5	Vehicle Crush Profile at H-Point Height	3-6
6	Vehicle Crush Profile at Mid-Door Height	3-8
7	Vehicle Crush Profile at Window Sill Height	3-10
8	Vehicle Crush Profile at Window Top Height	3-12

List of Photographs

Title	Figure
Pre-Test Front View	A-1
Post-Test Front View	A-2
Pre-Test Left Front View	A-3
Post-Test Left Front View	A-4
Pre-Test Left Side View	A-5
Post-Test Left Side View	A-6
Pre-Test Left Rear View	A-7
Post-Test Left Rear View	A-8
Pre-Test Rear View	A-9
Post-Test Rear View	A-10
Pre-Test Right Side View	A-11
Post-Test Right Side View	A-12
Pre-Test Overhead Alignment - View 1	A-13
Pre-Test Overhead Alignment - View 2	A-14

Section 1.0

Purpose and Test Procedure

Purpose and Test Procedure

The purpose of this non-deformable crabbed impactor side impact test was for research and development in support of the CRASH3 damage algorithm reformulation.

The 1988 Ford Taurus was equipped with a 3.8-liter, 6-cylinder, transverse, gasoline engine with a 3-speed automatic transmission. The test weight of the vehicle was 1419 killograms.

The vehicle was instrumented with eleven (11) accelerometers to measure vehicle X-axis, Y-axis, and Z-axis acceleration.

The impactor was crabbed 27° counterclockwise from the direction of forward motion. The test weight of the impactor was 1328 kg.

The impactor was instrumented to record data from five (5) accelerometers to measure X-axis, Y-axis, and Z-axis acceleration.

The crash test event was recorded by three (3) high-speed motion picture cameras operating at approximately 1000 frames per second.

Section 2.0

Vehicle and Test Data

Table 1 Test Vehicle Information

Vehicle Manufacturer: Ford Motor Company Model Year: 1988

Make/Model: Ford/Taurus GL VIN: 1FABP5240SA215297

Body Style: 4-door Sedan Color: Brown

Engine Data: Type: Transverse Cylinders: 6 Displacement: 3.8-liter

Transmission Data: 3 Speed, __ Manual, X Automatic, X Fwd, _ Rwd, _4wd

Date Vehicle Received: 09/30/94 Odometer Reading: 74,708

Dealer's Name and Address: NA

Accessories:

Power Steering	Yes	Automatic Transmission	Yes
Power Brakes	Yes	Automatic Speed Control	Yes
Power Seats	Yes	Tilting Steering Wheel	Yes
Power Windows	Yes	Telescoping Steering Wheel	No
Tinted Glass	Yes	Air Conditioning	Yes
Radio	Yes	Anti-Skid Brake	No
Clock	Yes	Rear Window Defroster	Yes
Other	None		

Remarks:

1. Is the vehicle stock throughout? Yes
2. Does vehicle show evidence of prior accident history? No
3. Does vehicle show any significant corrosion? No
4. Condition of the front/rear bumper and frame: Good

Certification Data From Vehicle's Label:

Vehicle Manufactured By: Ford Motor Company
Date of Manufacture: 03/88 VIN: 1FABP5240SA215297
GVWR: 4615 lbs.
GAWR: Front: 2594 lbs., Rear: 2135 lbs.

Table 1 Test Vehicle Information, Cont'd.

Tires On Vehicle (Mfr., Line, Size): Remington, P205/65R15

Tire Pressure With Maximum Capacity Vehicle Load: Front: 241 kPa
Rear: 241 kPa

Spare Tire (Mfr., Line, Size): Michelin, T135/80R14

Type of Seats: Front: Split Bench
Rear: Bench

Type of Front Seat Backs: Manually adjustable

Maximum Width: 1803 mm

Wheelbase: 2700 mm

Location of Label Stating Tire Data:

The label was located on the right rear passenger door.

Tire & Capacity Data From Vehicle's Label:

Recommended Tire Size: P205/65R15

Recommended Cold Tire Pressure: Front: 35 psi; Rear: 35 psi

Designated Seating Capacity: 2 Front 3 Rear 5 Total

Vehicle Capacity Weight: 900 lbs.

Test Vehicle Attitude (All measurements are in millimeters.):

Delivered Attitude: LF 685; RF 686; LR 648; RR 647
Pre-Test Attitude: LF 678; RF 681; LR 634; RR 635
Post-Test Attitude: LF 675; RF 718; LR 625; RR 653

Table 1 Vehicle Information, Cont'd.

Weight of Test Vehicle as Received (With Maximum Fluids):

Right Front	457	kg	Right Rear	247	kg
Left Front	484	kg	Left Rear	240	kg
Total Front Weight	941	kg	(65.9% of total vehicle weight)		
Total Rear Weight	487	kg	(34.1% of total vehicle weight)		
Total Delivered Weight	1428	kg			

Weight of Test Vehicle:

Right Front	446	kg	Right Rear	253	kg
Left Front	469	kg	Left Rear	251	kg
Total Front Weight	915	kg	(64.5% of total vehicle weight)		
Total Rear Weight	504	kg	(35.5% of total vehicle weight)		
Total Test Weight	1419	kg			

Weight of ballast secured in vehicle cargo area: 0 kg

Components removed to meet target test weight: None

CG = 959 mm rearward of front wheel centerline

Table 2 Impactor Information

Impactor Type: FMVSS 214 with rigid face

Crabbed Angle[1]: 27°

Test Weight of Impactor:

RF	329	kg;	RR	335	kg
LF	573	kg;	LR	91	kg

Total Front Weight	902	kg
Total Rear Weight	426	kg
Total Test Weight	1328	kg

---

[1] As measured counterclockwise from the line of forward motion to the impactor's front longitudinal centerline.

Table 3

Profile Measurements At Vehicle Axle Height 250 mm

Location	0		1		2		3		4		5		6		7	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	282	1110	281	1045	284	975	296	890	304	812	310	737	328	657	344	585
Post-Test	296	1040	298	968	305	896	306	818	322	740	325	666	345	589	358	513

Location	8		9		10		11		12		13		14		15	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	355	510	365	443	417	379	484	352	553	326	620	312	693	296	NA	NA
Post-Test	382	440	396	374	440	308	511	277	582	267	653	252	723	240	NA	NA

Location	16		17		18		19		20		21		22		23	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	24		25		26		27		28		29		30		31	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	1610	269	1689	265	1769	265	1838	269	1927	274	1999	262
Post-Test	NA	NA	NA	NA	1692	338	1748	379	1811	431	1873	421	1955	423	2035	428

Location	32		33		34		35		36		37		38		39	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2077	260	2150	260	2224	253	2302	259	2378	257	2448	258	2540	258	2615	259
Post-Test	2106	425	2185	435	2260	429	2340	432	2410	440	2496	445	2555	447	2635	458

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 3, Cont'd.

Profile Measurements At Vehicle Axle Height 250 mm

Location	40		41		42		43		44		45		46		47	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2684	260	2757	256	2816	255	2893	257	2967	257	3044	267	3119	265	3190	260
Post-Test	2707	463	2787	464	2846	467	2919	477	3000	492	3076	486	3153	475	3227	473

Location	48		49		50		51		52		53		54		55	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3274	259	3348	262	3390	271	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	3300	477	3349	427	3420	394	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	56		57		58		59		60		61		62		63	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	72		73		74		75		76		77		78		79	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 4

Profile Measurements At Vehicle H-Point Height 539 mm

Location	0		1		2		3		4		5		6		7	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	284	1084	282	1003	288	930	288	853	298	784	297	702	312	632	324	554
Post-Test	305	1014	305	936	308	860	310	784	318	714	330	629	339	557	354	480

Location	8		9		10		11		12		13		14		15	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	329	472	353	405	380	332	464	296	540	259	615	251	690	241	765	232
Post-Test	375	399	390	333	420	256	504	218	576	200	653	194	727	192	820	202

Location	16		17		18		19		20		21		22		23	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	24		25		26		27		28		29		30		31	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	1535	200	1609	197	1684	193	1756	196	1834	195	1910	194	1987	194
Post-Test	NA	NA	1597	292	1655	305	1746	411	1824	400	1895	404	1970	403	2033	407

Location	32		33		34		35		36		37		38		39	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2064	188	2138	188	2214	181	2290	184	2365	181	2440	182	2522	177	2593	176
Post-Test	2125	405	2200	411	2276	408	2348	410	2430	415	2505	417	2594	417	2658	425

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 4, Cont'd.

Profile Measurements At Vehicle H-Point Height 539 mm

Location	40		41		42		43		44		45		46		47	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2667	180	2743	178	2785	175	2859	182	2940	180	3010	178	3084	179	3159	179
Post-Test	2725	426	2796	452	2856	440	2890	430	2979	428	3076	430	3157	432	3225	427

Location	48		49		50		51		52		53		54		55	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3237	180	3310	184	3382	188	3463	182	3542	180	NA	NA	NA	NA	NA	NA
Post-Test	3304	421	3355	395	3409	362	3488	318	3543	301	NA	NA	NA	NA	NA	NA

Location	56		57		58		59		60		61		62		63	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4219	195	4295	204	4370	200
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4226	158	4301	163	4377	165

Location	64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4445	203	4520	211	4574	221	4651	233	4797	255	4877	372	4891	449	4894	529
Post-Test	4454	172	4527	175	4582	180	4650	188	4800	215	4885	335	4888	410	4904	490

Location	72		73		74		75		76		77		78		79	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4902	604	4909	680	4918	752	4925	834	4928	905	4934	979	4934	1054	NA	NA
Post-Test	4916	565	4918	642	4917	715	4930	798	4930	870	4931	942	4931	1015	NA	NA

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 5

Profile Measurements At Vehicle Mid Door Height 633mm

Location	0		1		2		3		4		5		6		7	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	304	1082	311	1004	310	928	310	850	317	778	324	698	342	630	347	554
Post-Test	330	1011	337	935	330	860	335	775	340	700	358	620	370	555	383	480

Location	8		9		10		11		12		13		14		15	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	352	473	378	402	405	335	460	310	540	281	615	271	694	265	768	256
Post-Test	397	415	417	340	445	261	517	228	591	220	669	212	745	207	801	184

Location	16		17		18		19		20		21		22		23	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	845	245	920	227	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1377	205
Post-Test	895	197	972	186	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1433	240

Location	24		25		26		27		28		29		30		31	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	1454	206	1526	211	1604	206	1678	200	1750	201	1824	202	1902	201	1977	202
Post-Test	1506	252	1578	259	1654	262	1766	375	1825	391	1900	392	1971	390	2036	395

Location	32		33		34		35		36		37		38		39	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2048	197	2123	197	2198	190	2275	194	2350	190	2427	190	2504	185	2580	188
Post-Test	2121	390	2213	395	2293	390	2367	392	2440	388	2516	397	2590	397	2663	403

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 5, Cont'd.

Profile Measurements At Vehicle Mid Door Height 633mm

Location	40		41		42		43		44		45		46		47	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2656	188	2732	189	2785	184	2858	192	2932	189	3006	189	3083	190	3157	188
Post-Test	2738	402	2799	432	2853	438	2931	430	3001	440	3076	441	3152	446	3231	437

Location	48		49		50		51		52		53		54		55	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3238	187	3315	191	3391	194	3467	190	3542	187	3617	180	3695	178	NA	NA
Post-Test	3318	435	3369	388	3431	362	3486	311	3556	294	3616	275	3686	239	NA	NA

Location	56		57		58		59		60		61		62		63	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	3994	183	4070	193	4143	193	4220	200	4292	215	4366	212
Post-Test	NA	NA	NA	NA	3980	181	4055	179	4130	183	4210	188	4288	195	4352	193

Location	64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4443	217	4520	231	4570	243	4650	260	4744	309	4770	375	4783	452	4786	538
Post-Test	4430	196	4502	208	4554	209	4625	223	4730	255	4755	346	4768	415	4770	500

Location	72		73		74		75		76		77		78		79	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4793	605	4800	678	4807	754	4813	830	4814	905	4819	978	4822	1048	NA	NA
Post-Test	4793	577	4790	650	4788	726	4780	803	4808	876	4813	952	4815	1024	NA	NA

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 6

Profile Measurements At Vehicle Window Sill Height 912 mm

Location	0		1		2		3		4		5		6		7	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	8		9		10		11		12		13		14		15	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	16		17		18		19		20		21		22		23	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	916	336	992	316	1067	318	1142	309	1216	303	1290	286	1365	290
Post-Test	NA	NA	974	290	1050	284	1125	273	1200	277	1275	273	1350	263	1425	266

Location	24		25		26		27		28		29		30		31	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	1439	281	1517	277	1595	274	1673	268	1746	267	1816	265	1891	263	1967	271
Post-Test	1500	265	1580	263	1644	269	1751	320	1824	305	1895	313	1963	304	2035	315

Location	32		33		34		35		36		37		38		39	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2042	265	2118	266	2197	257	2272	261	2347	257	2422	256	2496	252	2573	254
Post-Test	2120	315	2193	325	2270	325	2344	318	2420	313	2495	315	2568	317	2646	317

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 6, Cont'd.

Profile Measurements At Vehicle Window Sill Height 912mm

Location	40		41		42		43		44		45		46		47	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2647	253	2718	250	2784	238	2857	251	2934	249	3009	245	3086	253	3162	246
Post-Test	2719	323	2789	321	2895	424	2950	435	3007	452	3066	432	3127	422	3200	407

Location	48		49		50		51		52		53		54		55	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3237	245	3311	246	3388	255	3463	248	3540	235	3616	234	3692	241	3767	241
Post-Test	3242	384	3333	339	3391	305	3465	256	3535	252	3610	242	3666	263	3750	262

Location	56		57		58		59		60		61		62		63	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3843	248	3919	242	3995	247	4073	250	4147	245	4216	251	4293	263	4370	256
Post-Test	3827	252	3900	253	3976	248	4053	246	4130	245	4209	241	4280	243	4360	236

Location	64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4443	258	4516	270	4592	277	4669	295	4736	318	4771	370	4785	459	4788	531
Post-Test	4437	240	4512	241	4589	245	4663	250	4734	284	4765	357	4781	430	4796	500

Location	72		73		74		75		76		77		78		79	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	4799	607	4802	682	4819	756	4826	830	4826	907	4830	982	4833	1056	NA	NA
Post-Test	4796	576	4800	648	4807	725	4815	797	4820	874	4821	948	4825	1021	NA	NA

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 7

Profile Measurements At Vehicle Window Top Height 1380 mm

Location	0		1		2		3		4		5		6		7	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	8		9		10		11		12		13		14		15	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	16		17		18		19		20		21		22		23	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	24		25		26		27		28		29		30		31	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	32		33		34		35		36		37		38		39	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	2297	541	2373	536	2452	530	2521	534	2592	534
Post-Test	NA	NA	NA	NA	NA	NA	2291	536	2266	527	2443	538	2520	530	2595	524

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Table 7, Cont'd.

Profile Measurements At Vehicle Window Top Height 1380 mm

Location	40		41		42		43		44		45		46		47	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	2670	526	2745	530	2793	534	2870	534	2948	532	3023	531	3099	533	3174	535
Post-Test	2670	525	2741	530	2798	522	2870	511	2948	518	3022	516	3100	516	3175	512

Location	48		49		50		51		52		53		54		55	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	3247	531	3324	533	3399	536	1564	541	3554	544	NA	NA	NA	NA	NA	NA
Post-Test	3250	475	3328	502	3404	510	1564	518	3552	525	NA	NA	NA	NA	NA	NA

Location	56		57		58		59		60		61		62		63	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Location	64		65		66		67		68		69		70		71	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

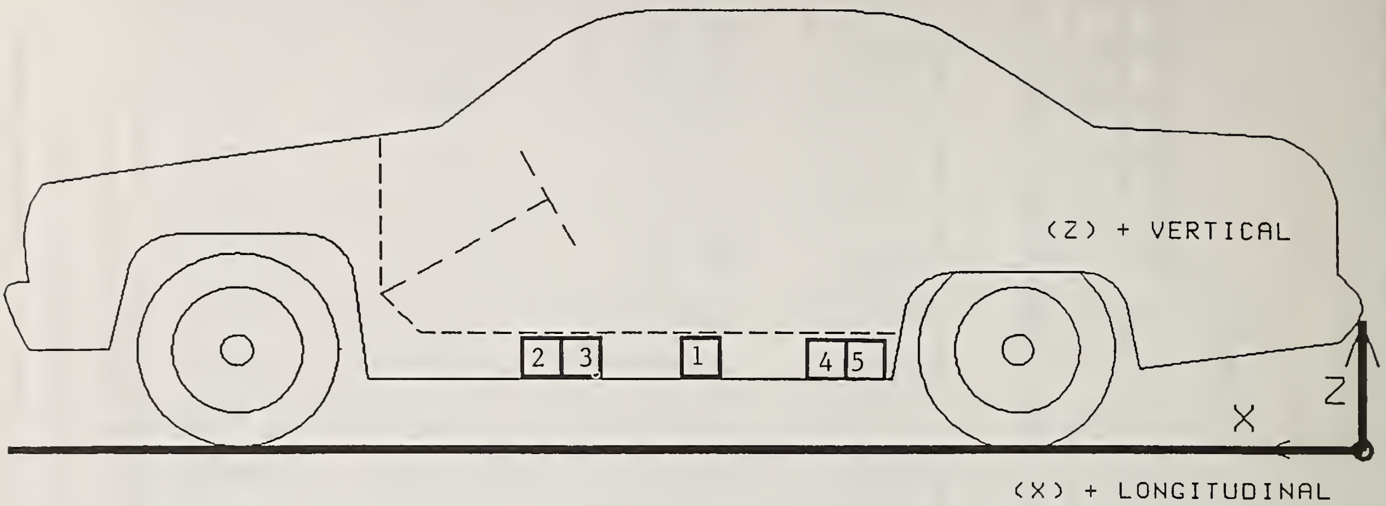
Location	72		73		74		75		76		77		78		79	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
Pre-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Post-Test	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All measurements are in millimeters. Column readings are 75 millimeters apart starting on the left side of the vehicle.

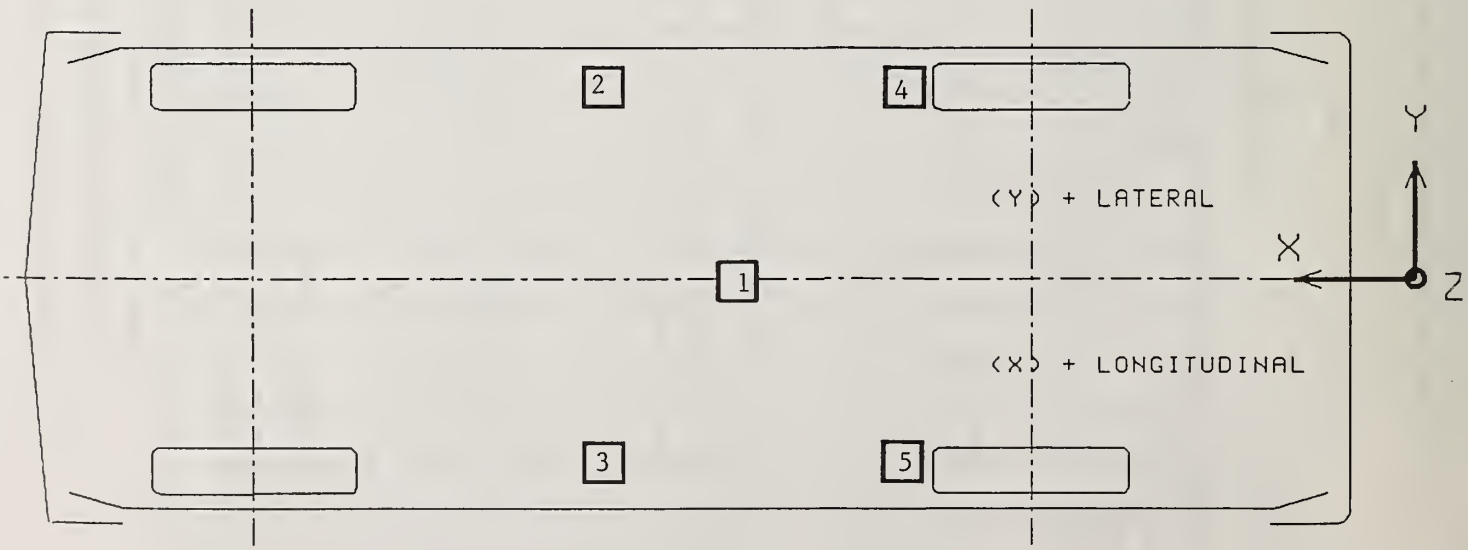
All X-axis measurements taken from a reference plane 500 millimeters from and parallel to the rear bumper.

All Y-axis measurements taken from a reference plane 1200 millimeters from and parallel to the vehicle's longitudinal centerline.

Figure 1 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 8 Vehicle Accelerometer Locations and Data Summary

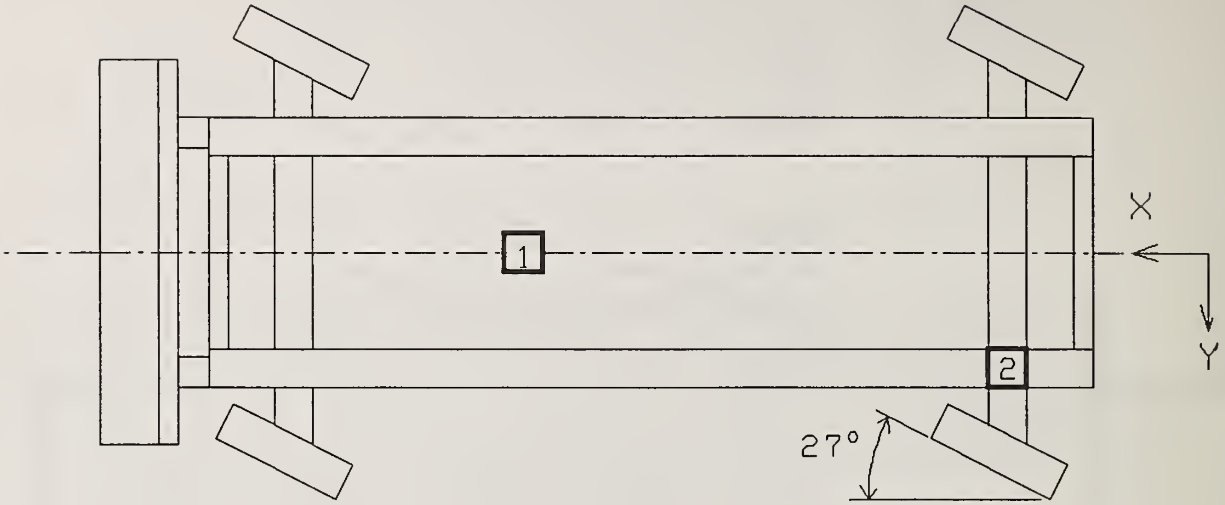
Test No. 941007

TEST NUMBER: 941007 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 VEHICLE CENTER OF GRAVITY	2913 mm	0 mm	321 mm		
LONGITUDINAL				5.8 g @ 49.5 ms	11.3 g @ 23.8 ms
LATERAL				4.5 g @ 72.2 ms	22.4 g @ 10.8 ms
VERTICAL				11.8 g @ 11.4 ms	19.3 g @ 33.2 ms
RESULTANT				26.0 g @ 33.3 ms	
2 LEFT FRONT SILL	2015 mm	682 mm	325 mm		
LONGITUDINAL[1]				76.8 g @ 13.8 ms	-0.9 g @ 0.0 ms
LATERAL				40.8 g @ 10.5 ms	141.0 g @ 6.6 ms
3 RIGHT FRONT SILL	1989 mm	-680 mm	303 mm		
LONGITUDINAL[1]				5.9 g @ 62.8 ms	16.0 g @ 31.9 ms
LATERAL				4.9 g @ 64.6 ms	26.8 g @ 35.8 ms
4 LEFT REAR SEAT CROSSMEMBER	1976 mm	547 mm	304 mm		
LONGITUDINAL				23.0 g @ 44.8 ms	112.4 g @ 19.4 ms
LATERAL[1]				14.8 g @ 24.9 ms	78.7 g @ 20.0 ms
5 RIGHT REAR SEAT CROSSMEMBER	1978 mm	-515 mm	330 mm		
LONGITUDINAL				25.6 g @ 50.6 ms	15.5 g @ 23.3 ms
LATERAL				3.4 g @ 47.1 ms	31.5 g @ 50.6 ms

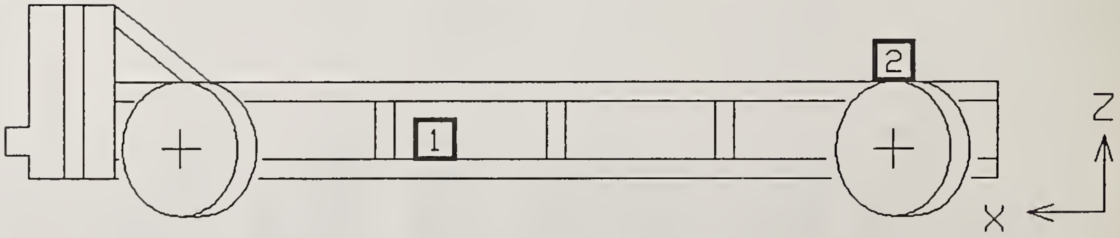
REFERENCE:
X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S LONGITUDINAL CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

[1] See DATA ACQUISITION EXPLANATIONS

Figure 2 Crabbed Impactor Accelerometer Placement



TOP VIEW



SIDE VIEW

Table 9 Crabbed Impactor Accelerometer Locations and Data Summary

Test No. 941007

TEST NUMBER: 941007 No. LOCATION	X	Y	Z	POSITIVE DIRECTION	NEGATIVE DIRECTION
1 CENTER OF GRAVITY	1842 mm	0 mm	315 mm		
LONGITUDINAL				0.8 g @ 131.4 ms	15.5 g @ 17.3 ms
LATERAL				7.4 g @ 28.6 ms	2.4 g @ 74.8 ms
VERTICAL				6.7 g @ 21.0 ms	6.1 g @ 14.1 ms
RESULTANT				17.0 g @ 20.8 ms	
2 LEFT FRAME RAIL OVER REAR AXLE	385 mm	638 mm	621 mm		
LONGITUDINAL				1.4 g @ 173.3 ms	18.8 g @ 18.4 ms
LATERAL				7.6 g @ 23.9 ms	1.5 g @ 16.5 ms

REFERENCE: X: + FORWARD FROM REARMOST POINT OF FRAME
Y: + LEFTWARD FROM BARRIER CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

Figure 3 Camera Positions

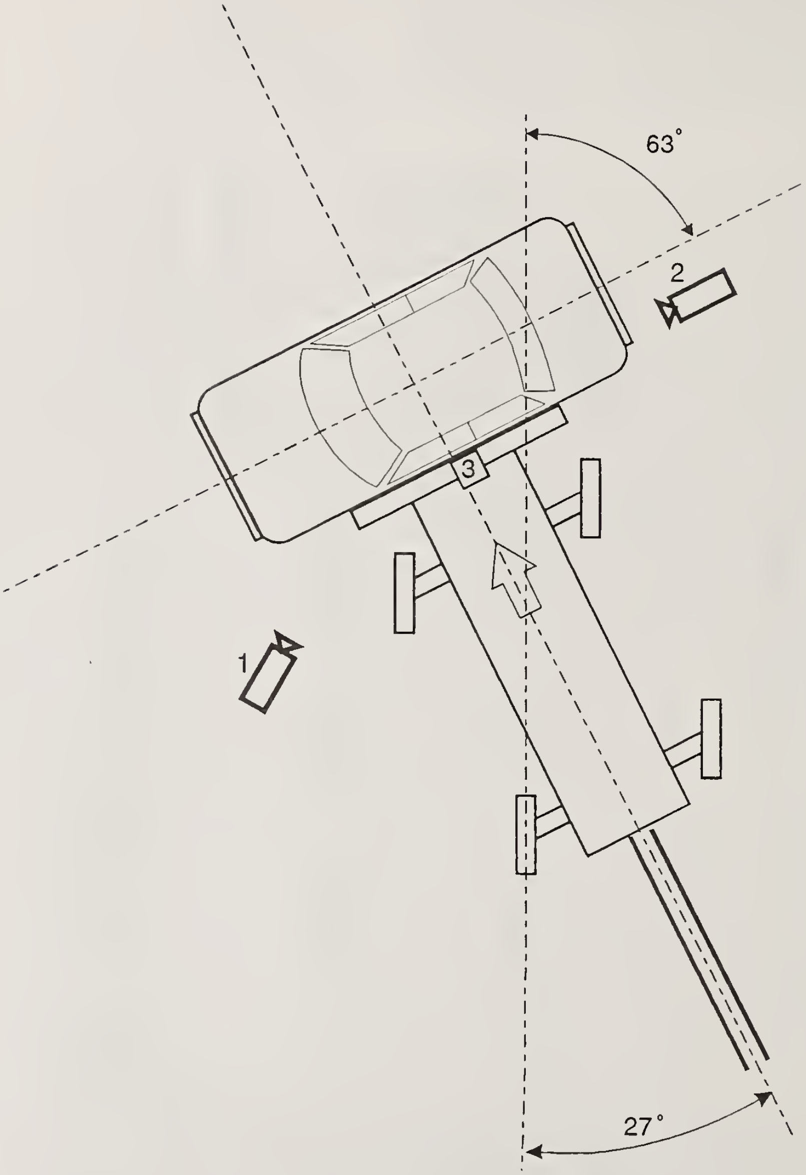


Table 10 Camera Information

Test No. 941007

Camera Number	Location	Type	Lens (mm)	Speed (fps)	Purpose of Camera Data
1	Left wide	Photosonic	13	1002	Impact overall
2	Right wide	Photosonic	13	1000	Impact overall
3	Overhead	Photosonic	8.5	1000	Impact overall

Section 3.0

Test Summary

Table 11 Test Conditions

Test No. 941007

Date of Test: 10/07/94

Time of Test: 12:45

Ambient Temperature at Impact Area: 21° C

Intended Impact Velocity: 53.9 kph

Actual Impact Velocity: Primary = 54.1 kph
Secondary = 54.1 kph

Subject Vehicle Data

Length of Direct Contact Damage: 1554 mm

Maximum Cumulative Crush
At Vehicle Axle Height: 235 mm
At Vehicle H-Point Height: 274 mm
At Vehicle Mid Door Height: 256 mm
At Vehicle Window Sill Height: 203 mm
At Vehicle Window Top Height: -56 mm

All distance measurements are in millimeters.

Table 12 Vehicle Crush at Axle Height

Test No. 941007

FL = 1728
C1 = 69
C2 = 166
C3 = 179
C4 = 204
C5 = 219
C6 = 123

NOTE: FL is the post-test length of the damaged surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the damaged surface. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in millimeters.

Figure 4 Vehicle Crush Profile at Axle Height

Test No. 941007

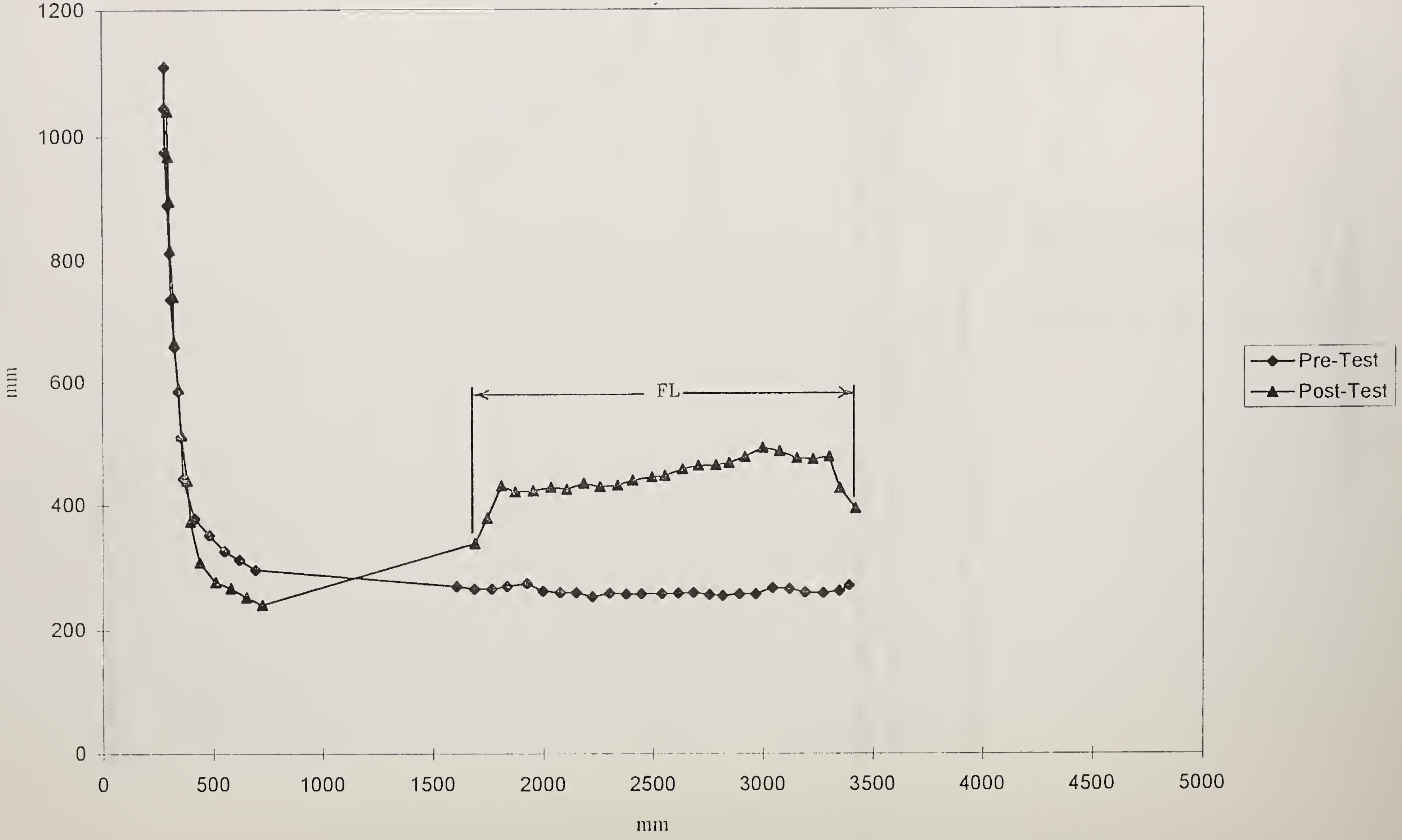


Table 13 Vehicle Crush at H-Point Height

Test No. 941007

FL = 1946
C1 = 92
C2 = 209
C3 = 226
C4 = 247
C5 = 252
C6 = 121

NOTE: FL is the post-test length of the damaged surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the damaged surface. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in millimeters.

Figure 5 Vehicle Crush Profile at H-Point Height

Test No. 941007

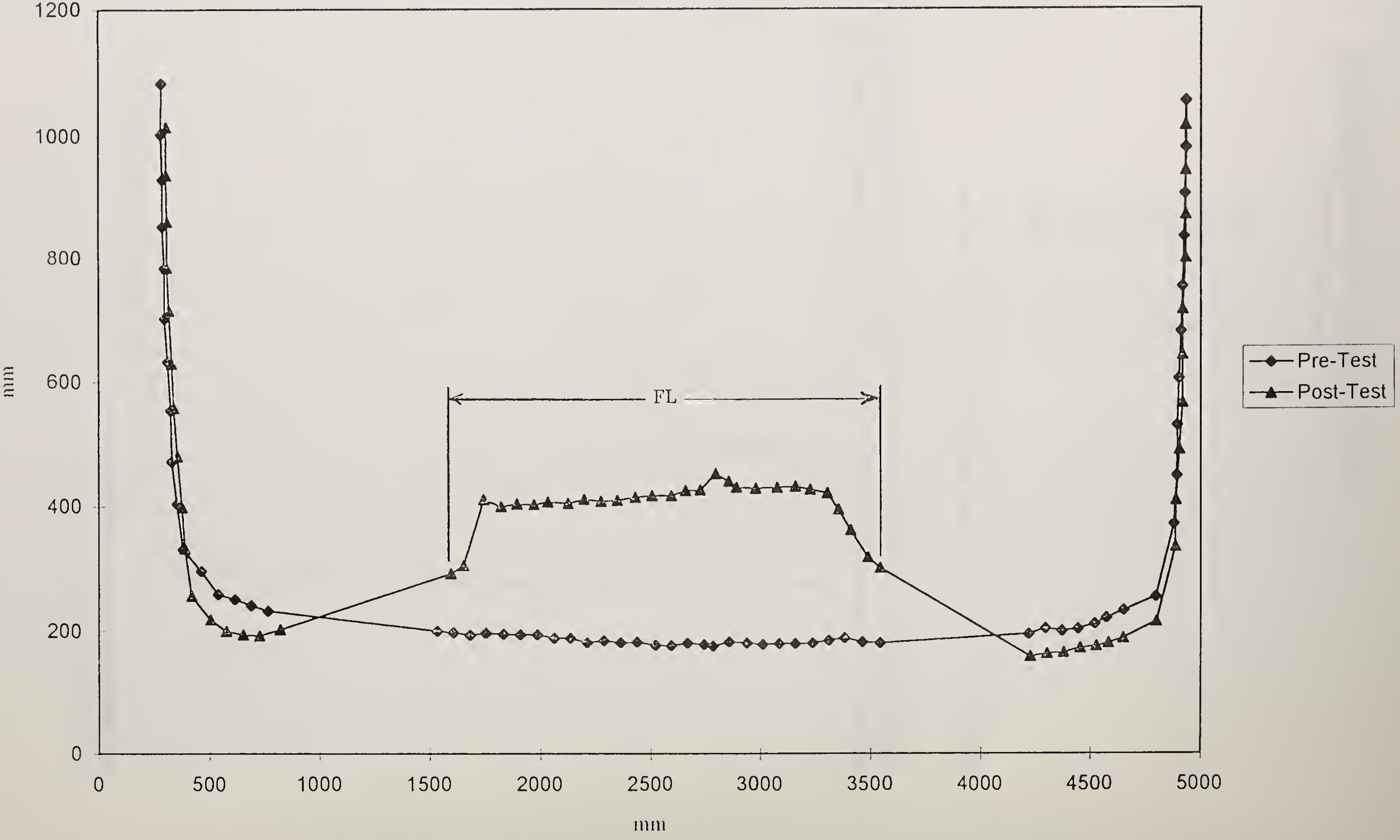


Table 14 Vehicle Crush at Mid Door Height

Test No. 941007

FL = 2253

C1 = 35

C2 = 190

C3 = 199

C4 = 236

C5 = 249

C6 = 61

NOTE: FL is the post-test length of the damaged surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the damaged surface. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in millimeters.

Figure 6 Vehicle Crush Profile at Mid-Door Height

Test No. 941007

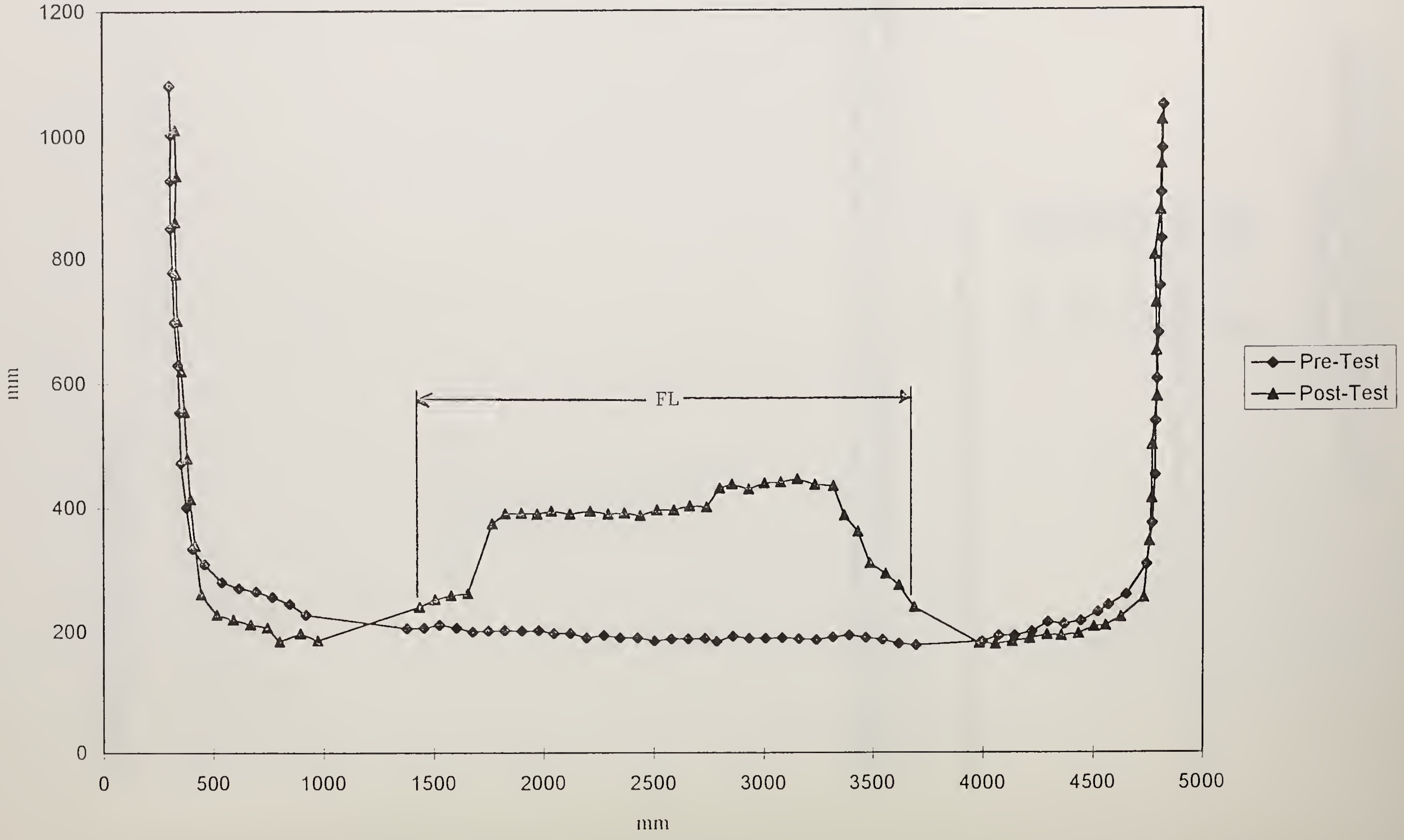


Table 15 Vehicle Crush at Window Sill Height

Test No. 941007

FL = 1640

C1 = 52

C2 = 47

C3 = 56

C4 = 70

C5 = 188

C6 = 50

NOTE: FL is the post-test length of the damaged surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the damaged surface. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in millimeters.

Figure 7 Vehicle Crush Profile at Window Sill Height

Test No. 941007

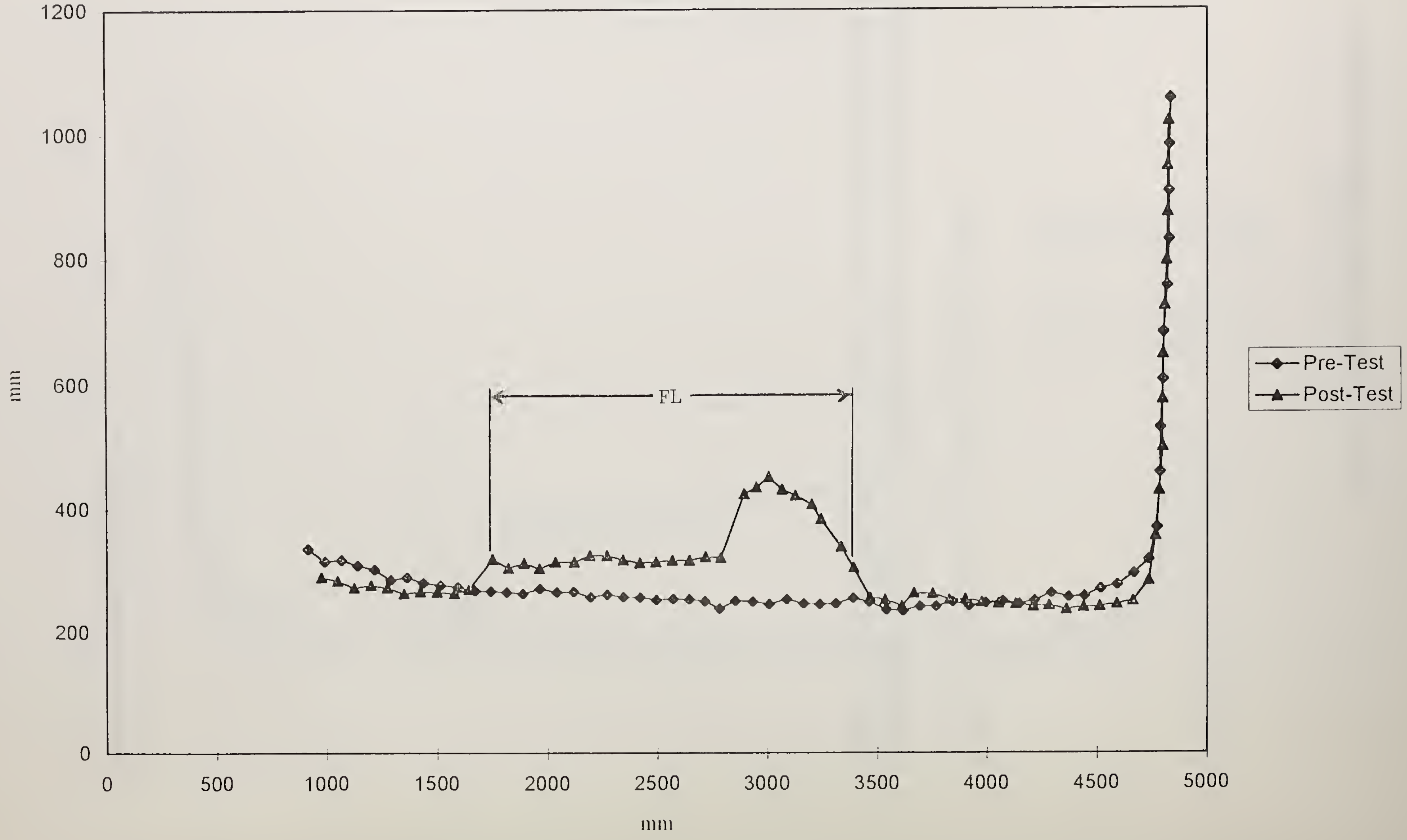


Table 16 Vehicle Crush at Window Top Height

Test No. 941007

FL = 754
C1 = -12
C2 = -14
C3 = -17
C4 = -56
C5 = -26
C6 = -19

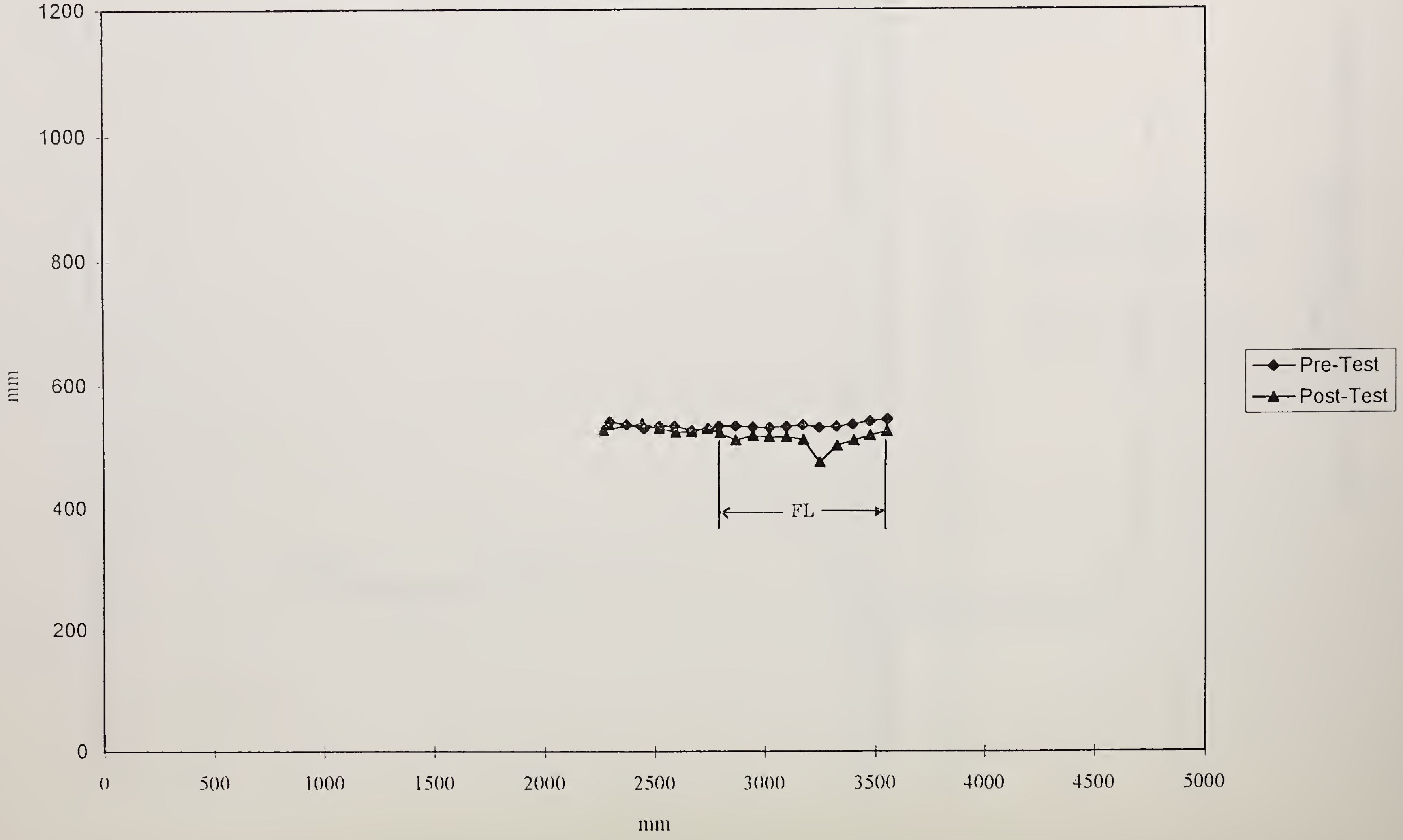
NOTE: FL is the post-test length of the damaged surface.

Measurements C1 - C6 were spaced equally apart over the post-impact length of the damaged surface. This distance is defined as length "FL" on the vehicle crush profile plot.

All measurements are in millimeters.

Figure 8 Vehicle Crush Profile at Window Top Height

Test No. 941007



Data Acquisition Explanations

The vehicle's left front sill X-axis acceleration data channel, LFSXG1, did not return to zero after the impact event. This anomaly affected the computations of the vehicle's left front sill X-axis velocity and displacement.

The vehicle's right front sill X-axis acceleration data channel, RFSXG1, did not return to zero after the impact event. This anomaly affected the computations of the vehicle's right front sill X-axis velocity and displacement.

The vehicle's left rear seat crossmember Y-axis acceleration data channel, TLRYG1, exceeded its data channel rated full scale output between 19 and 25 milliseconds. This anomaly affected the computations of the vehicle's left rear seat crossmember velocity and displacement.

Appendix A

Photographs

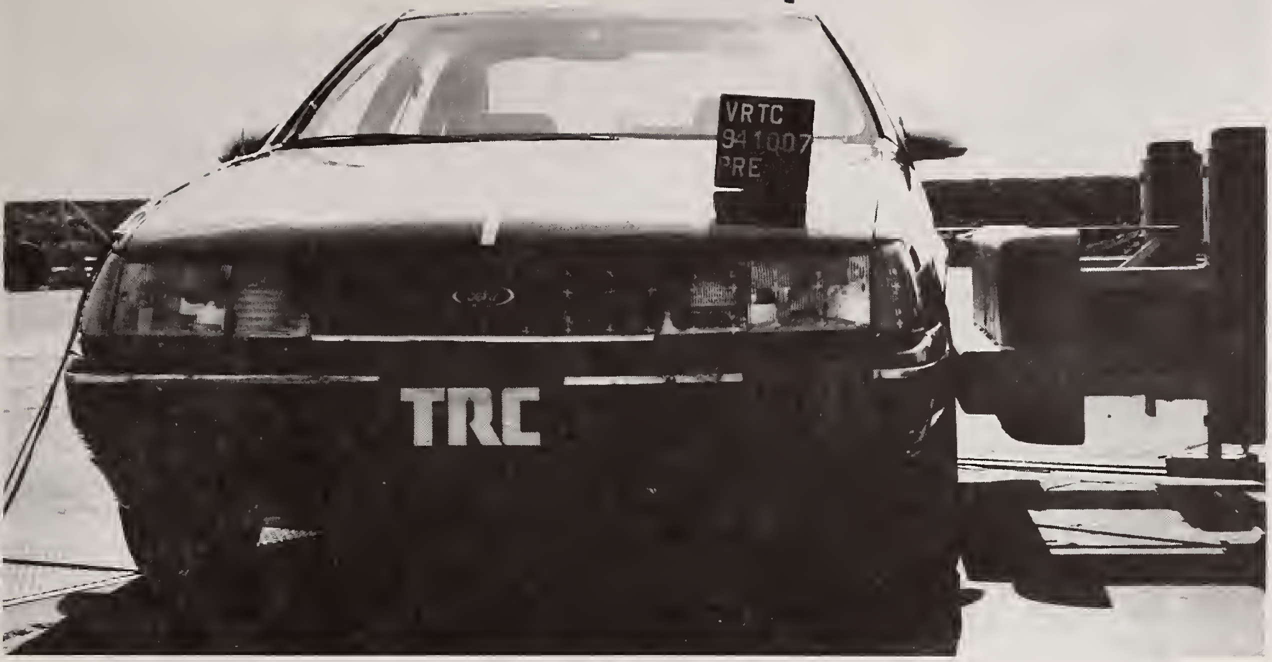


Figure A-1. Pre-Test Front View

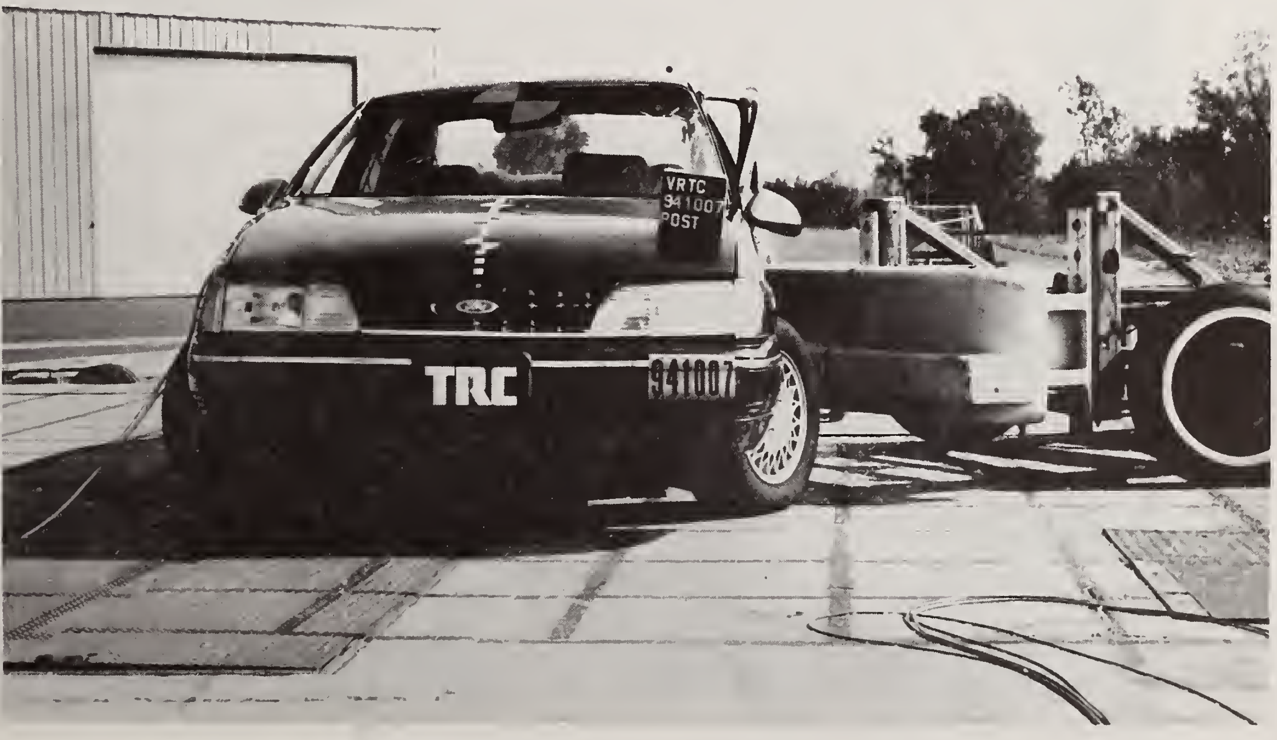


Figure A-2. Post-Test Front View

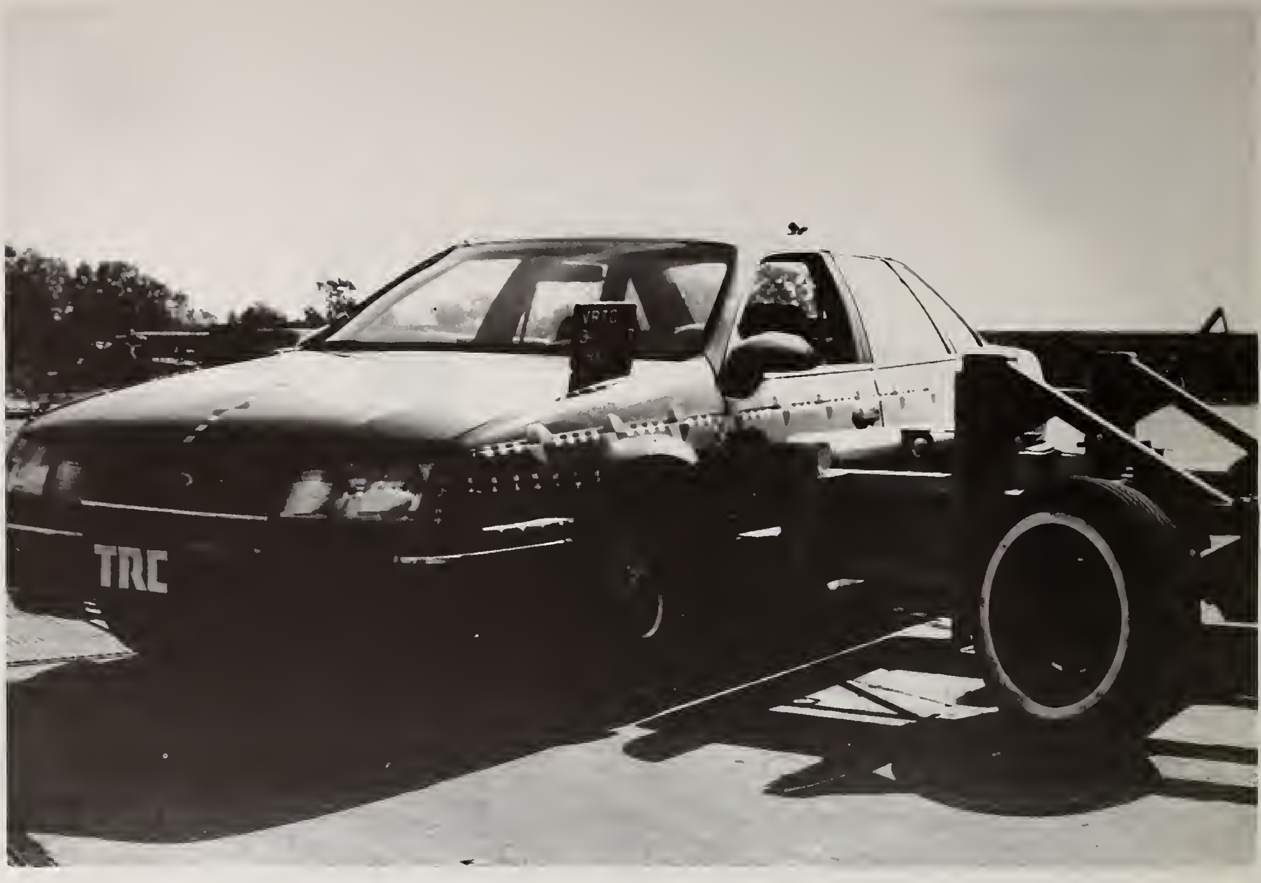


Figure A-3. Pre-Test Left Front View

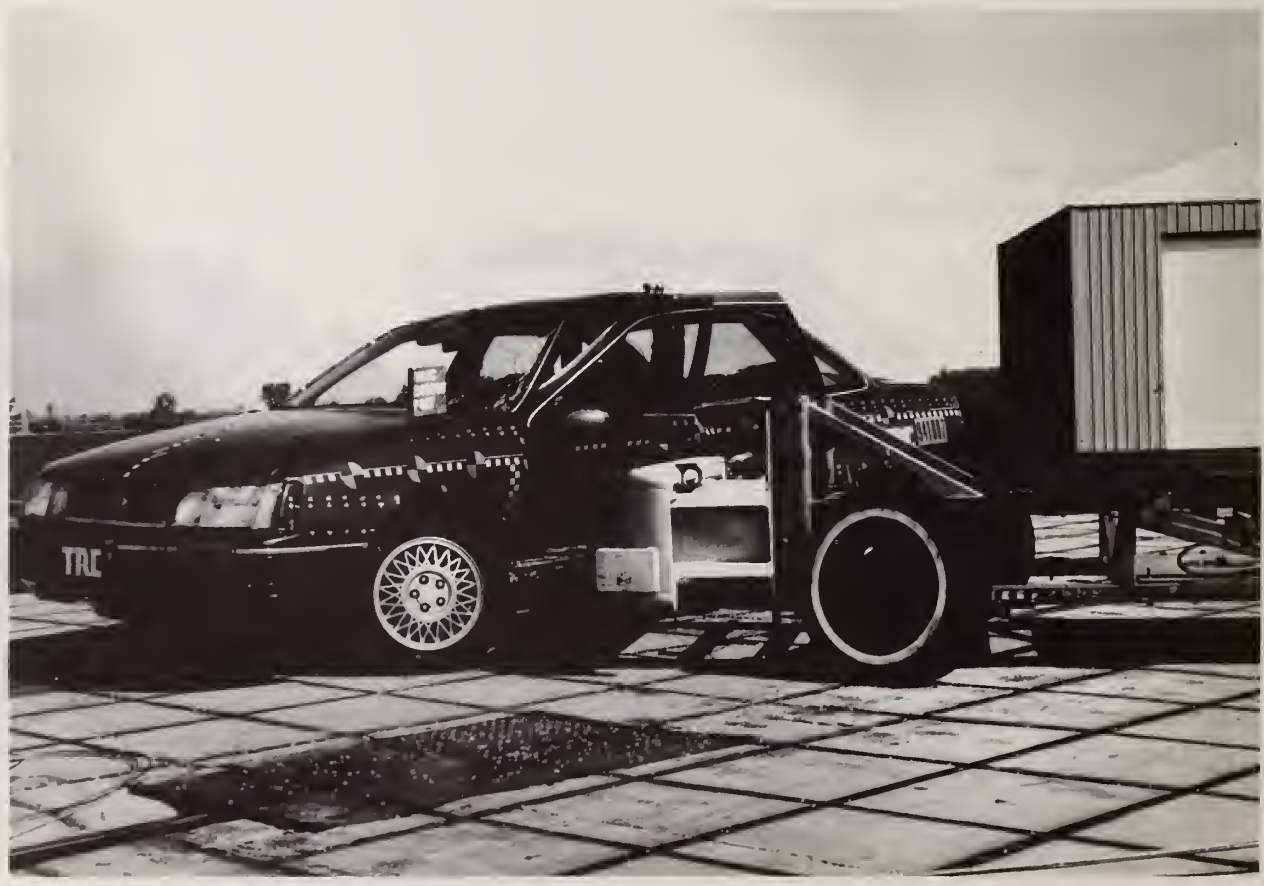


Figure A-4. Post-Test Left Front View

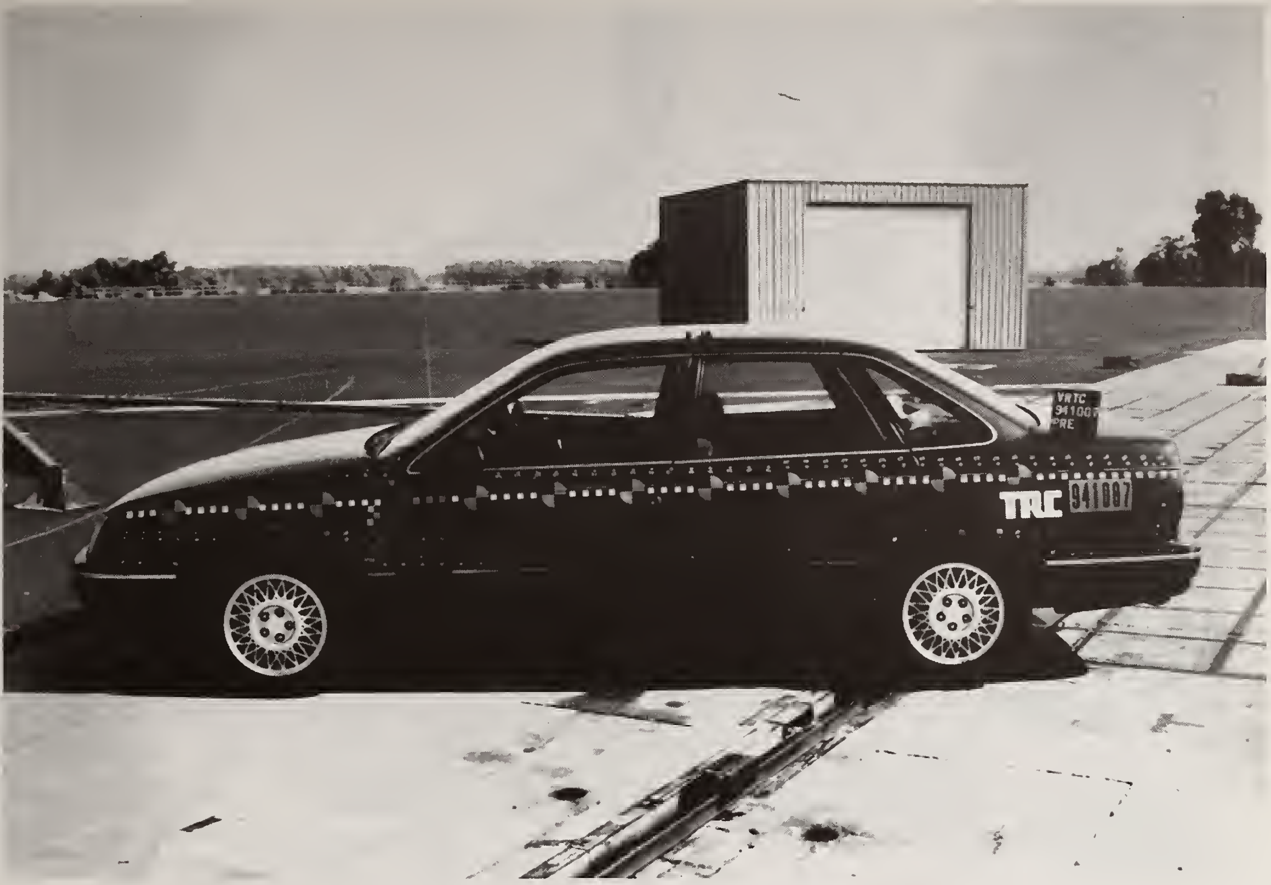


Figure A-5. Pre-Test Left Side View

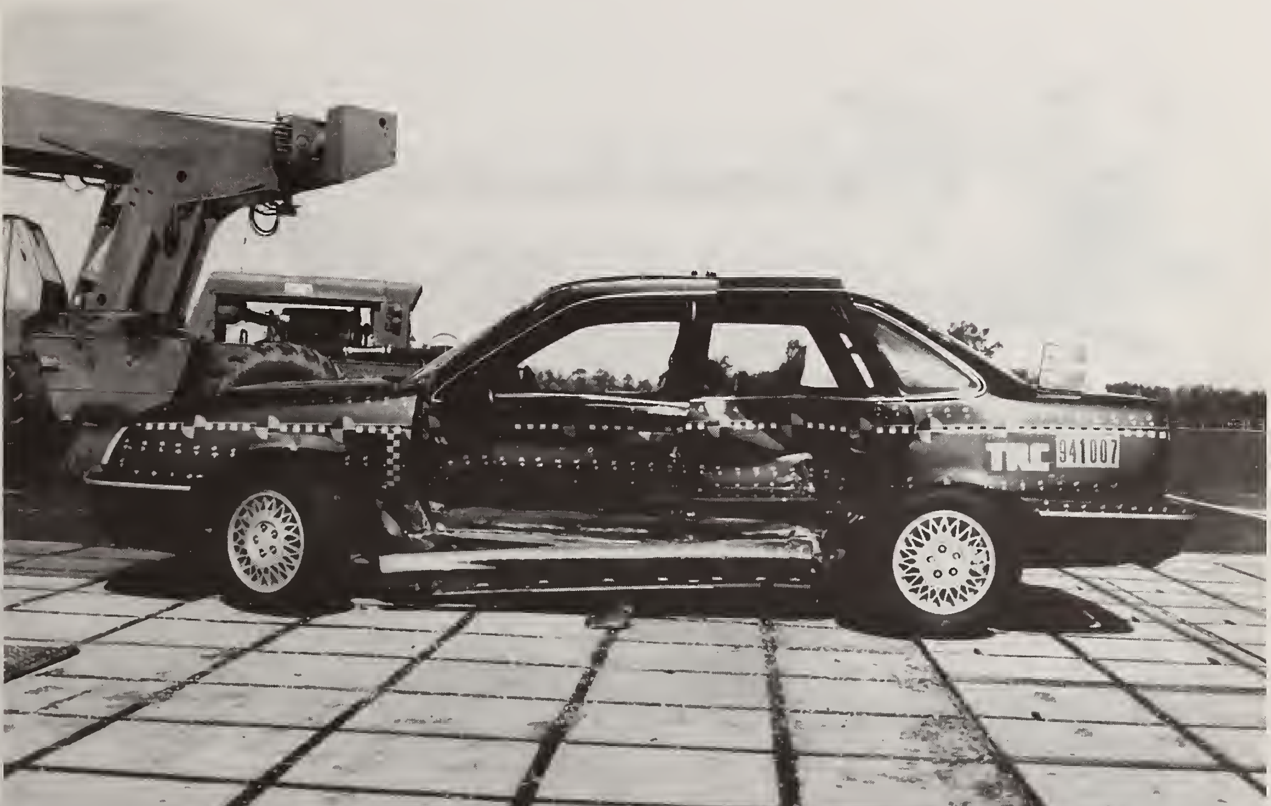


Figure A-6. Post-Test Left Side View

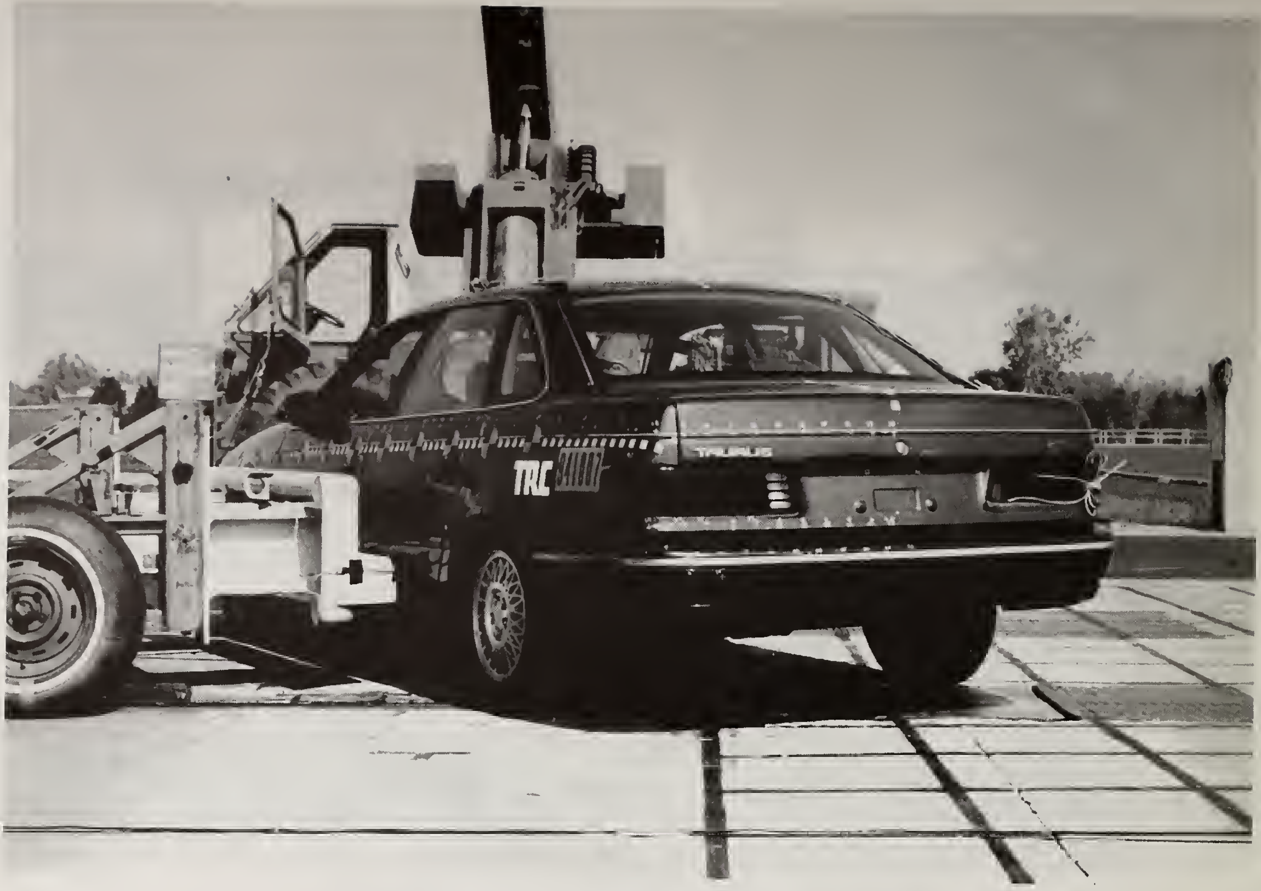


Figure A-7. Pre-Test Left Rear View

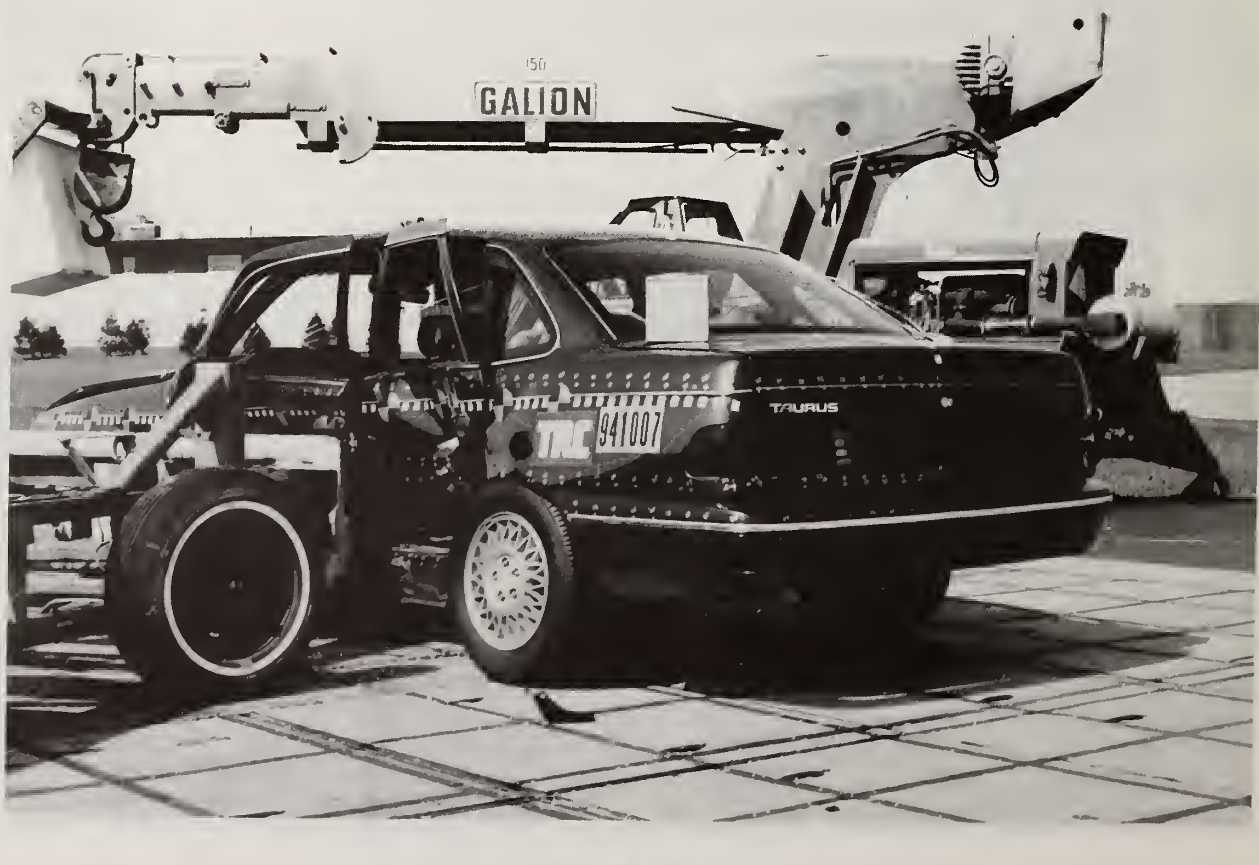


Figure A-8. Post-Test Left Rear View

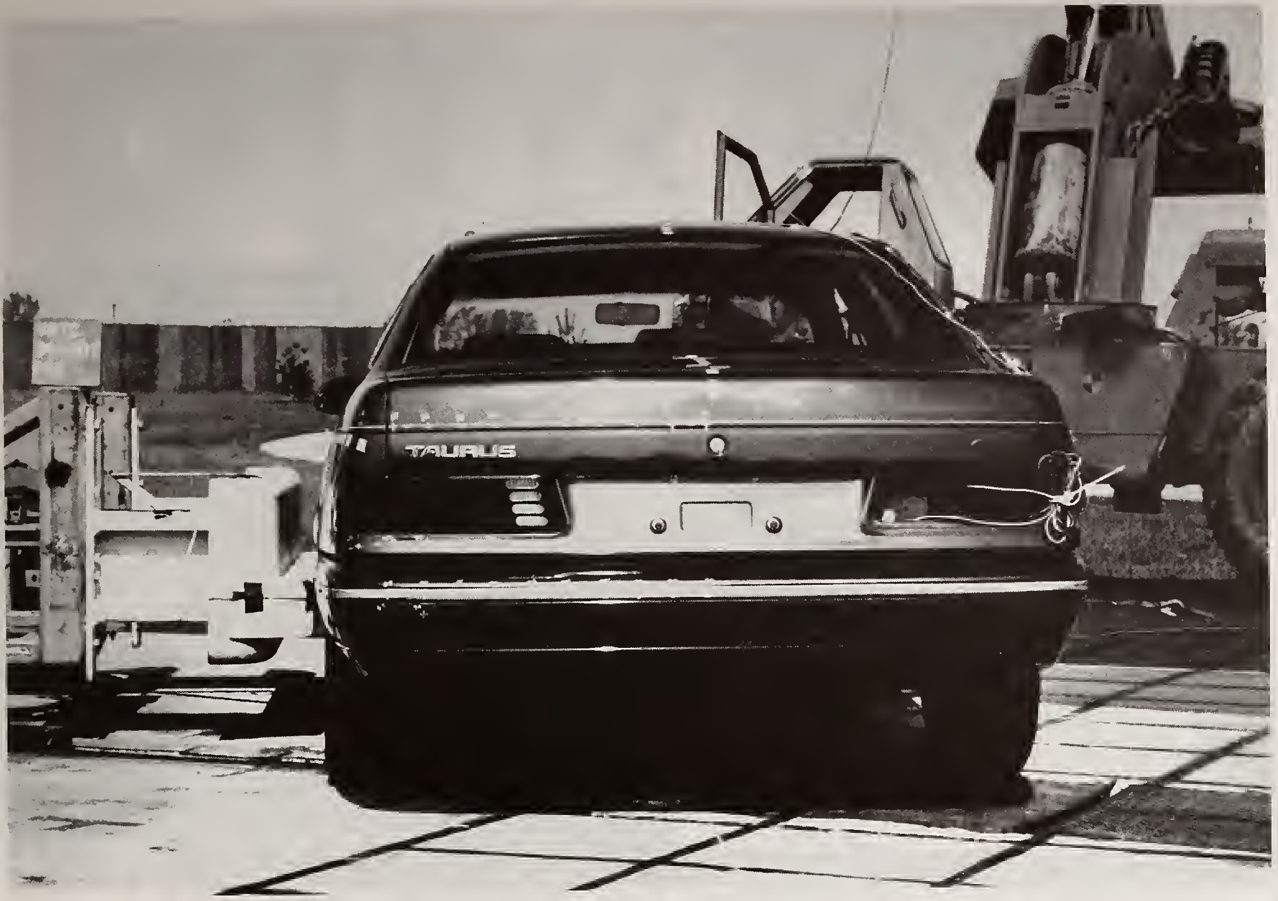


Figure A-9. Pre-Test Rear View

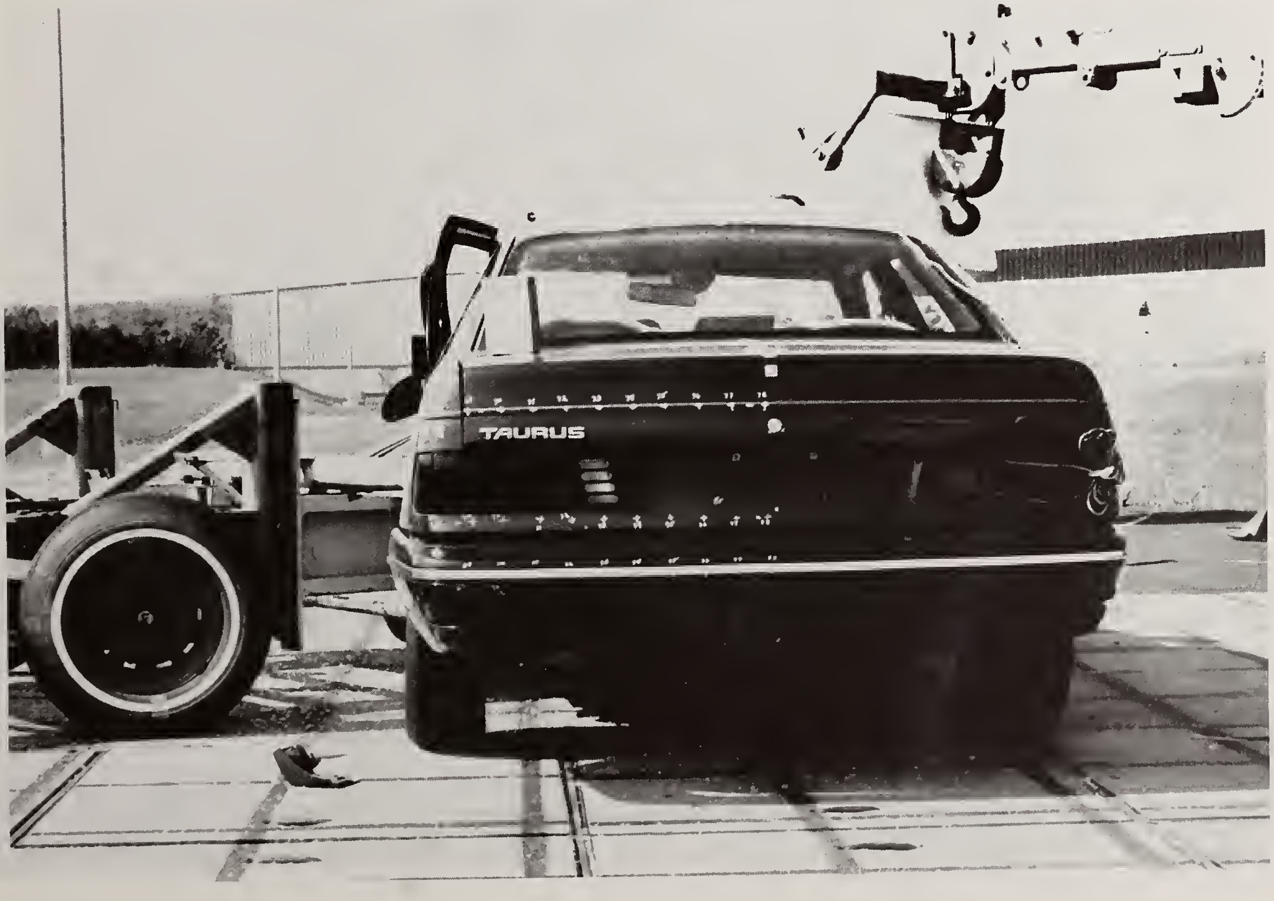


Figure A-10. Post-Test Rear View

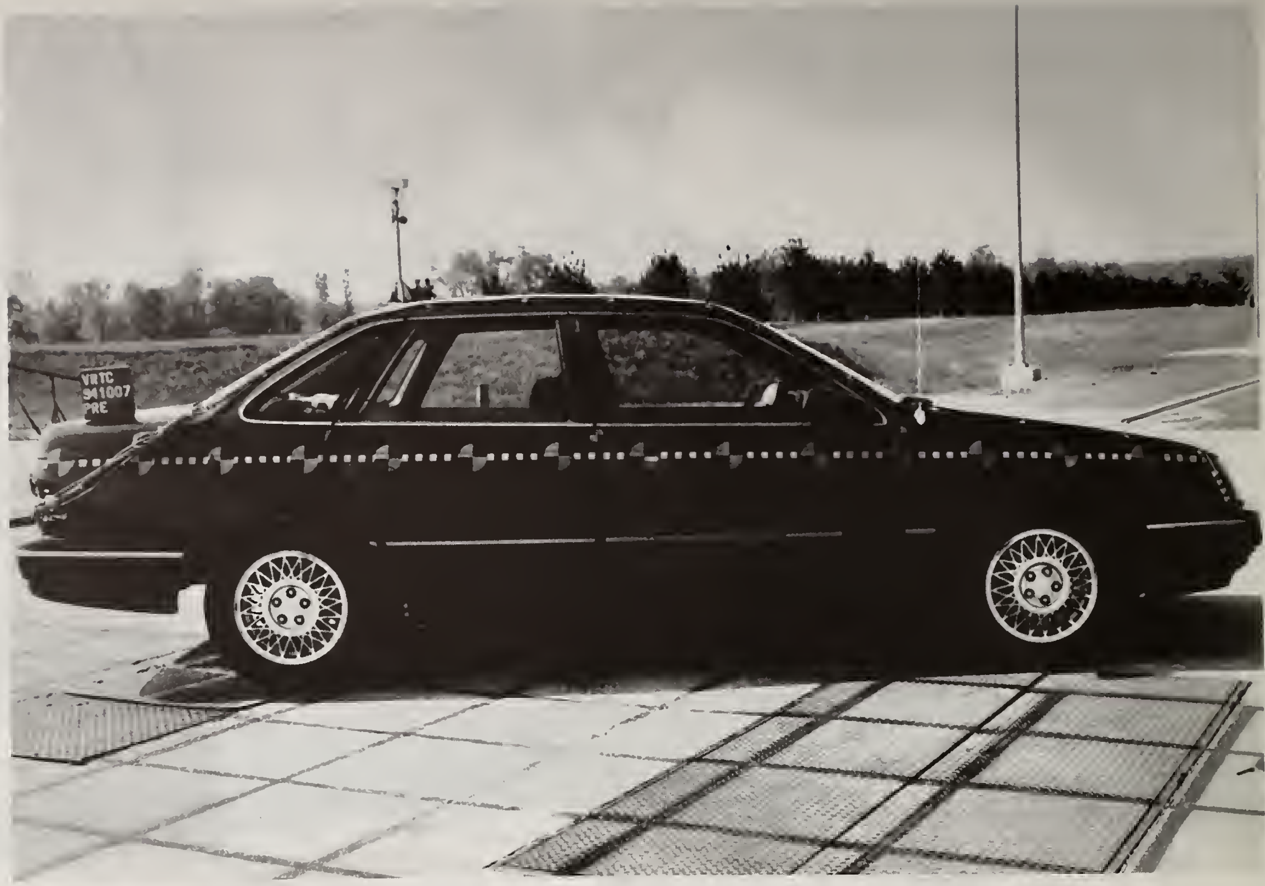


Figure A-11. Pre-Test Right Side View

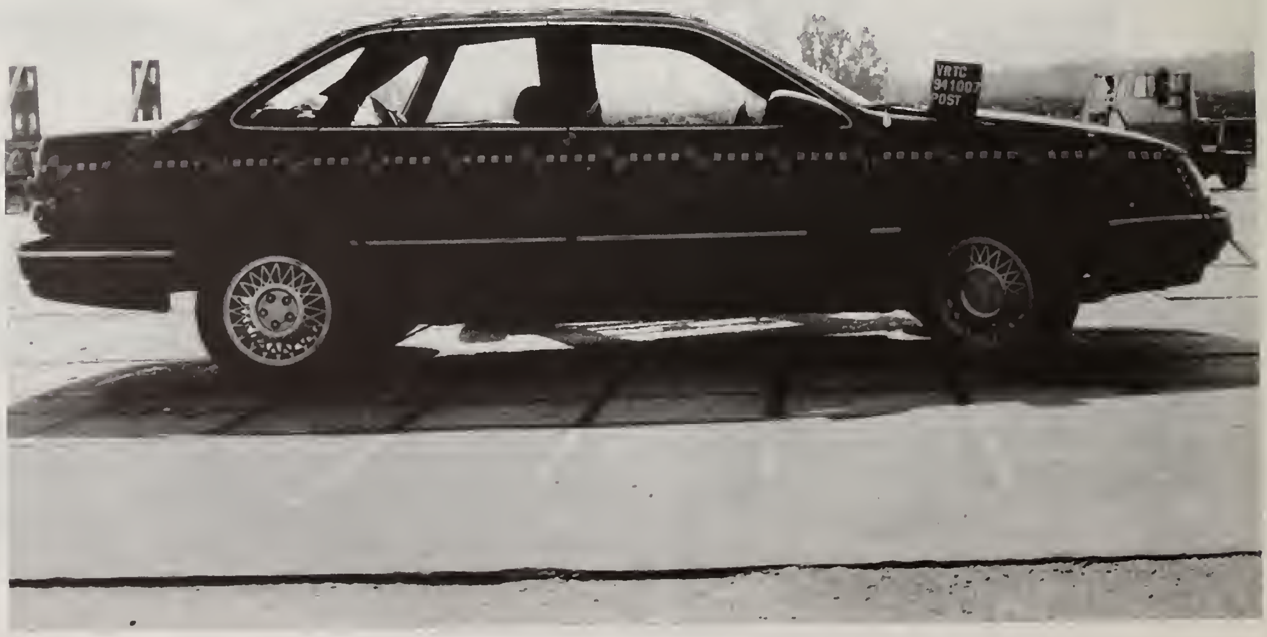


Figure A-12. Post-Test Right Side View

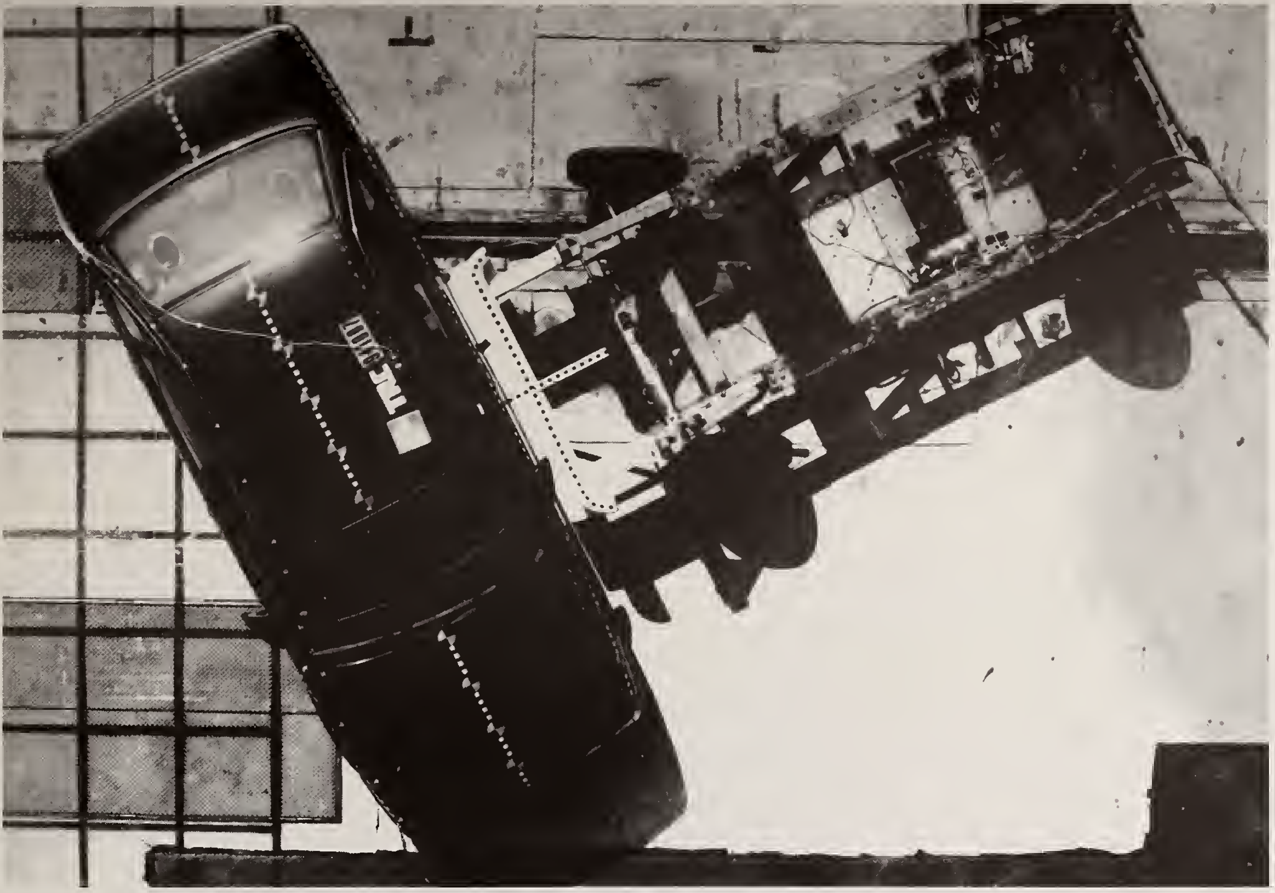


Figure A-13. Pre-Test Overhead Alignment - View 1

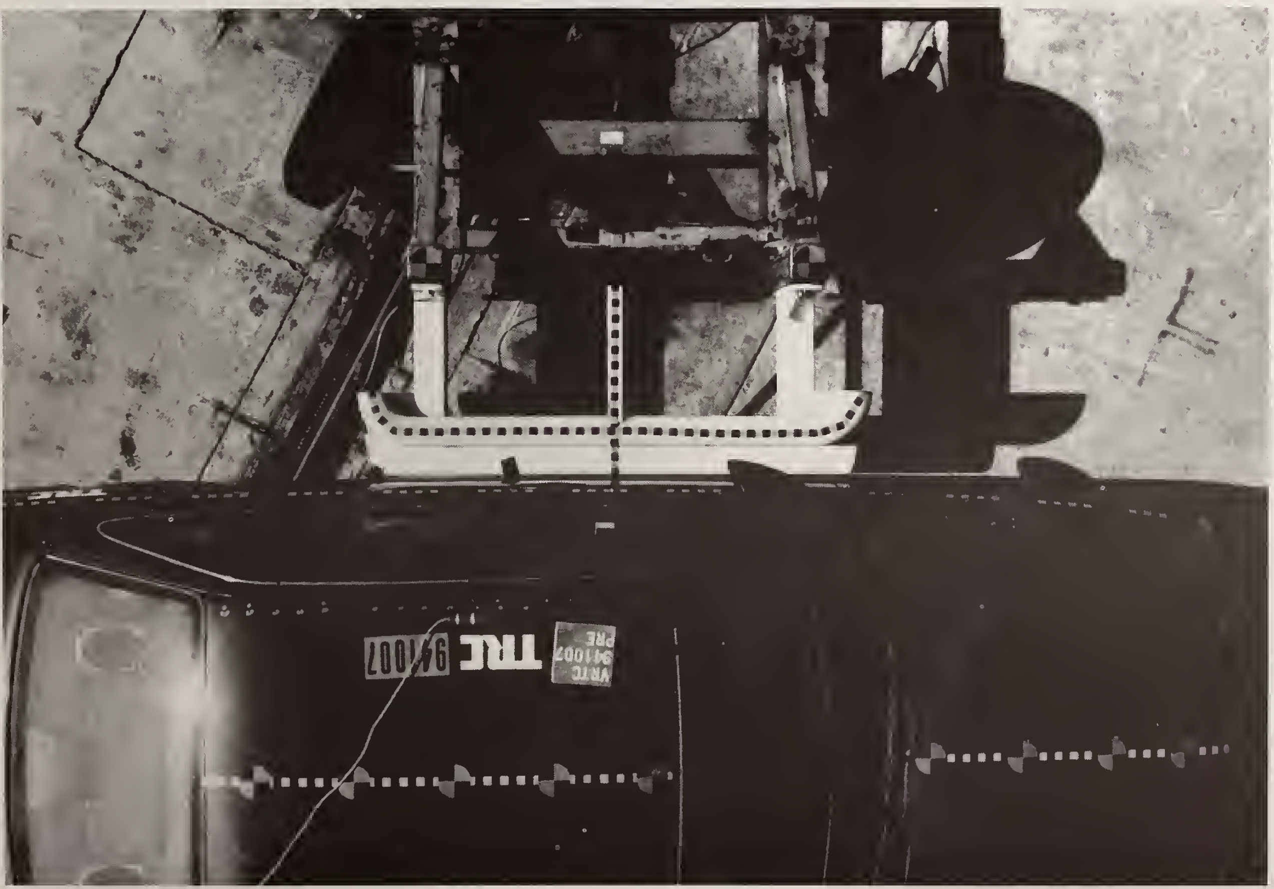
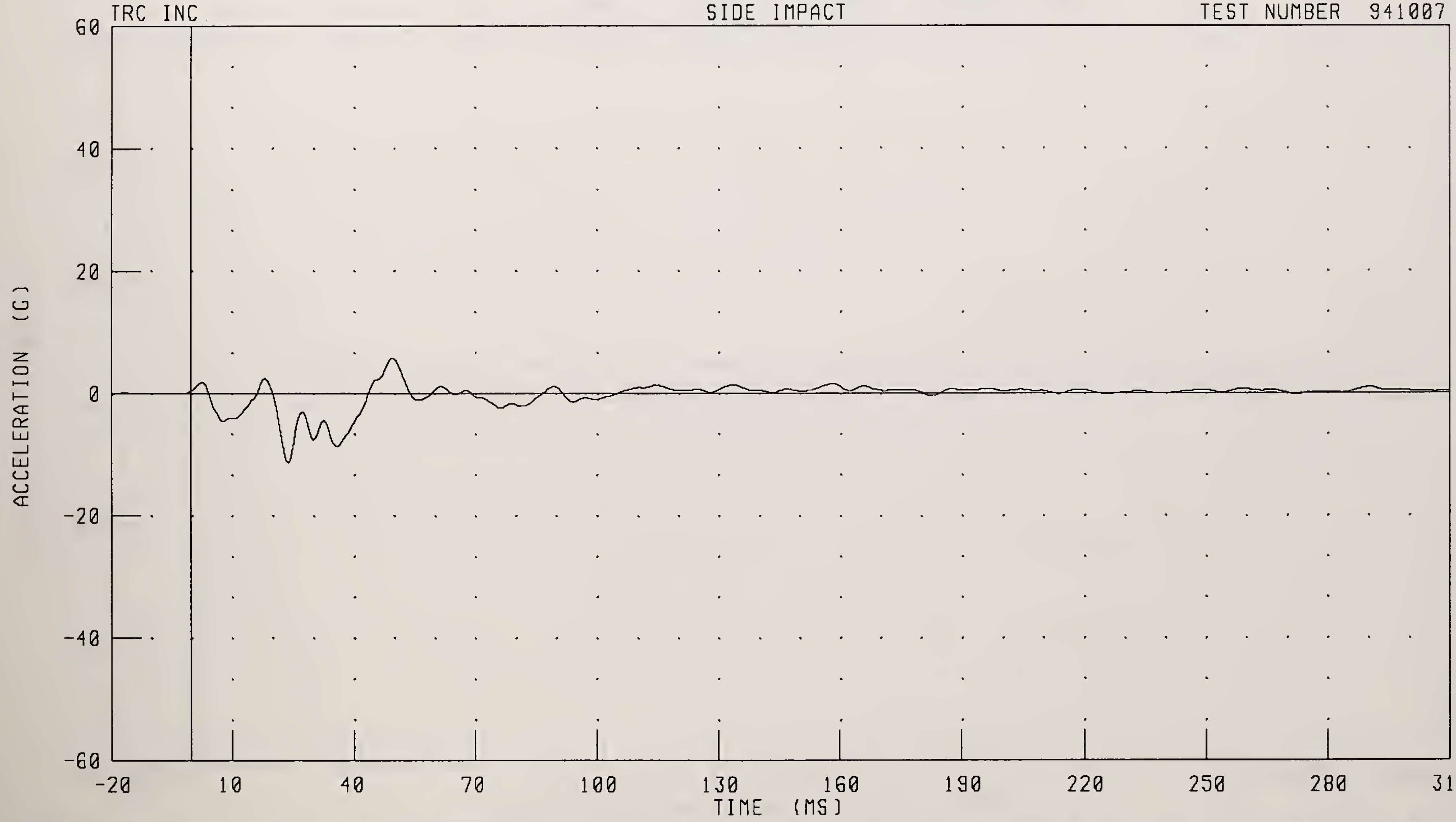


Figure A-14. Pre-Test Overhead Alignment - View 2

Appendix B

Data Plots

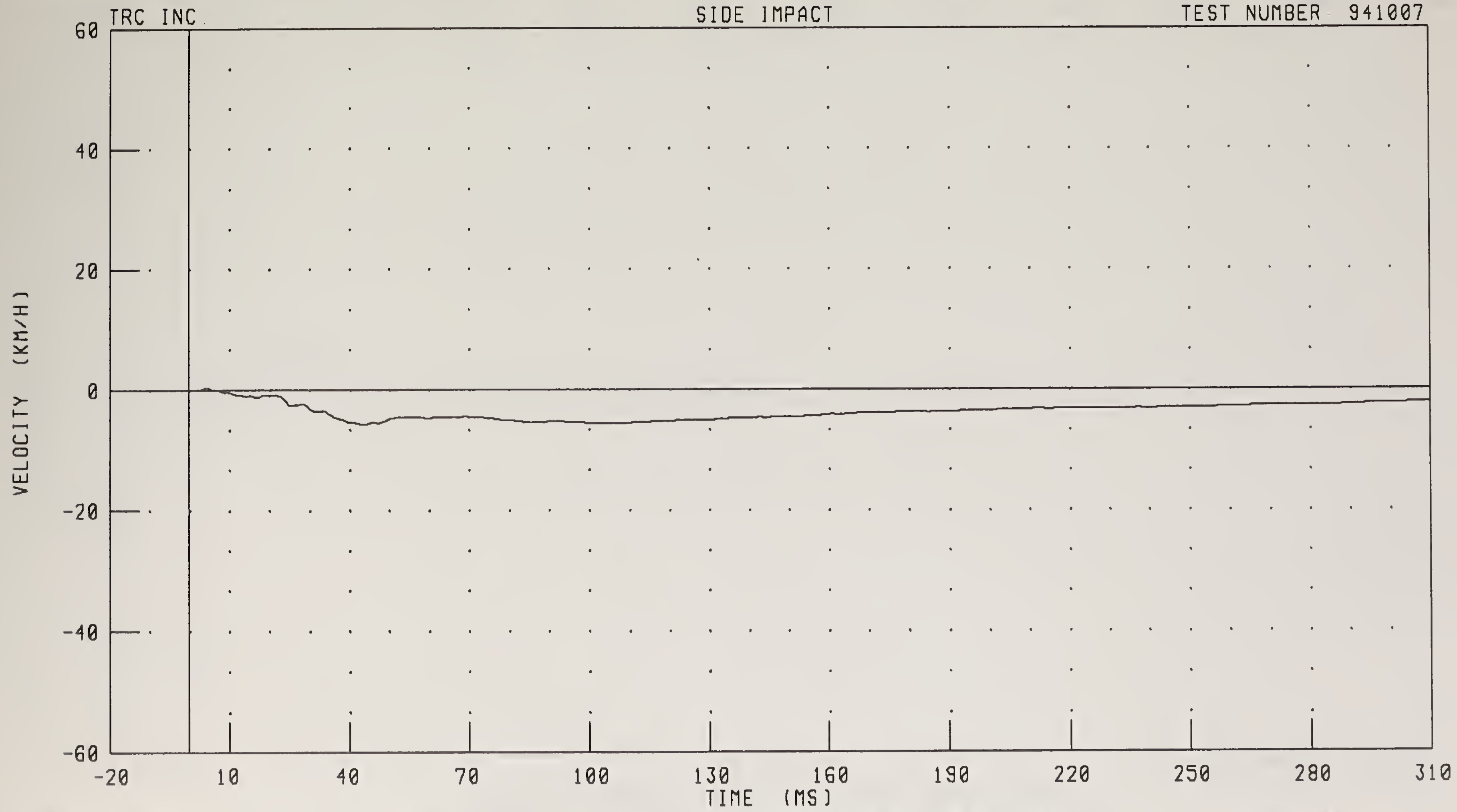
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY X-AXIS ACCELERATION



CHANNEL: VCGXG FILTER: CH. CLASS 60

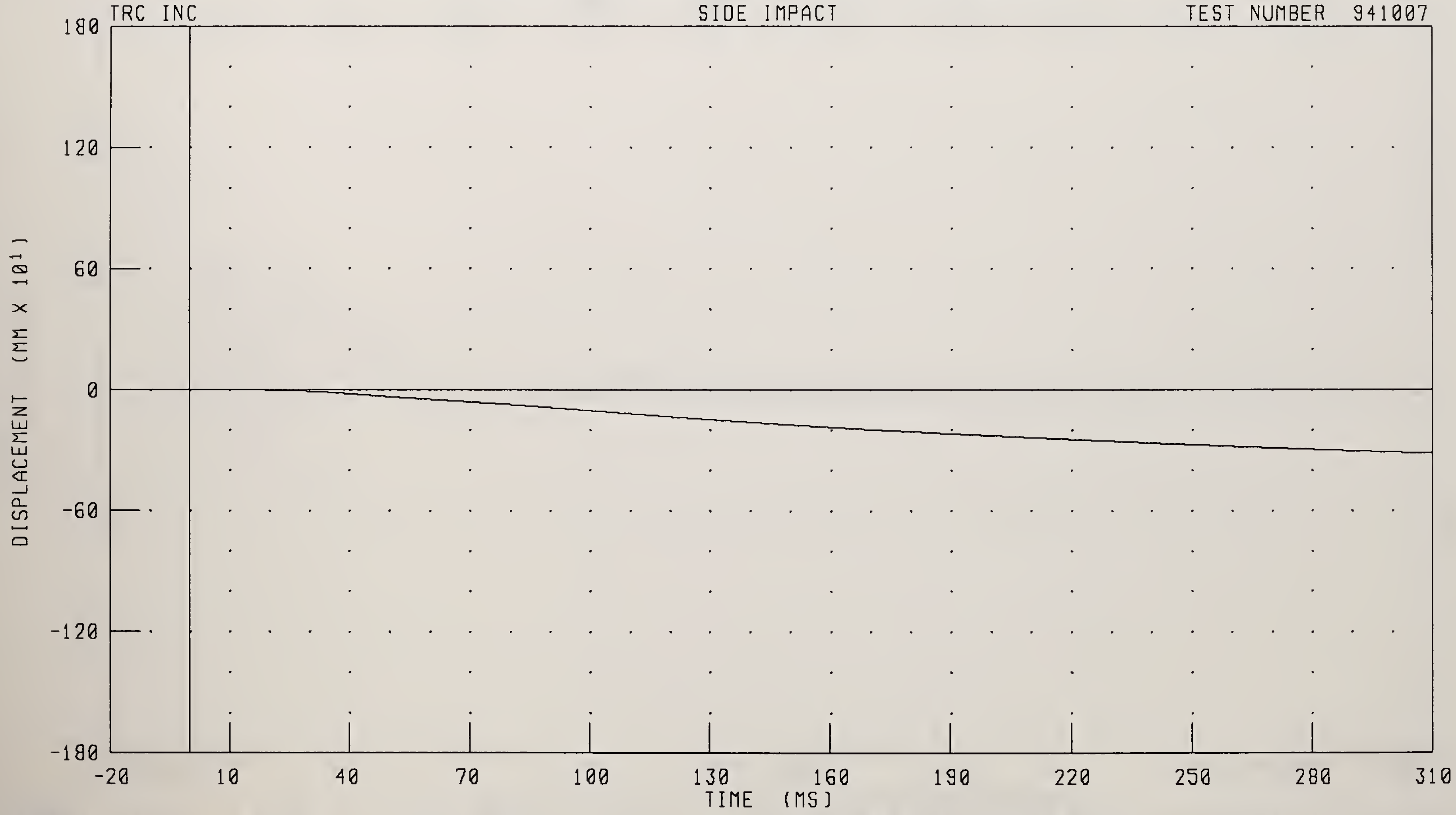
PEAK DATA: 5.79 G @ 49.52 MS; -11.34 G @ 23.84 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY X-AXIS VELOCITY



CHANNEL: VCGXV FILTER: CH. CLASS 180 PEAK DATA: 0.35 KM/H @ 4.24 MS; -5.77 KM/H @ 43.52 MS

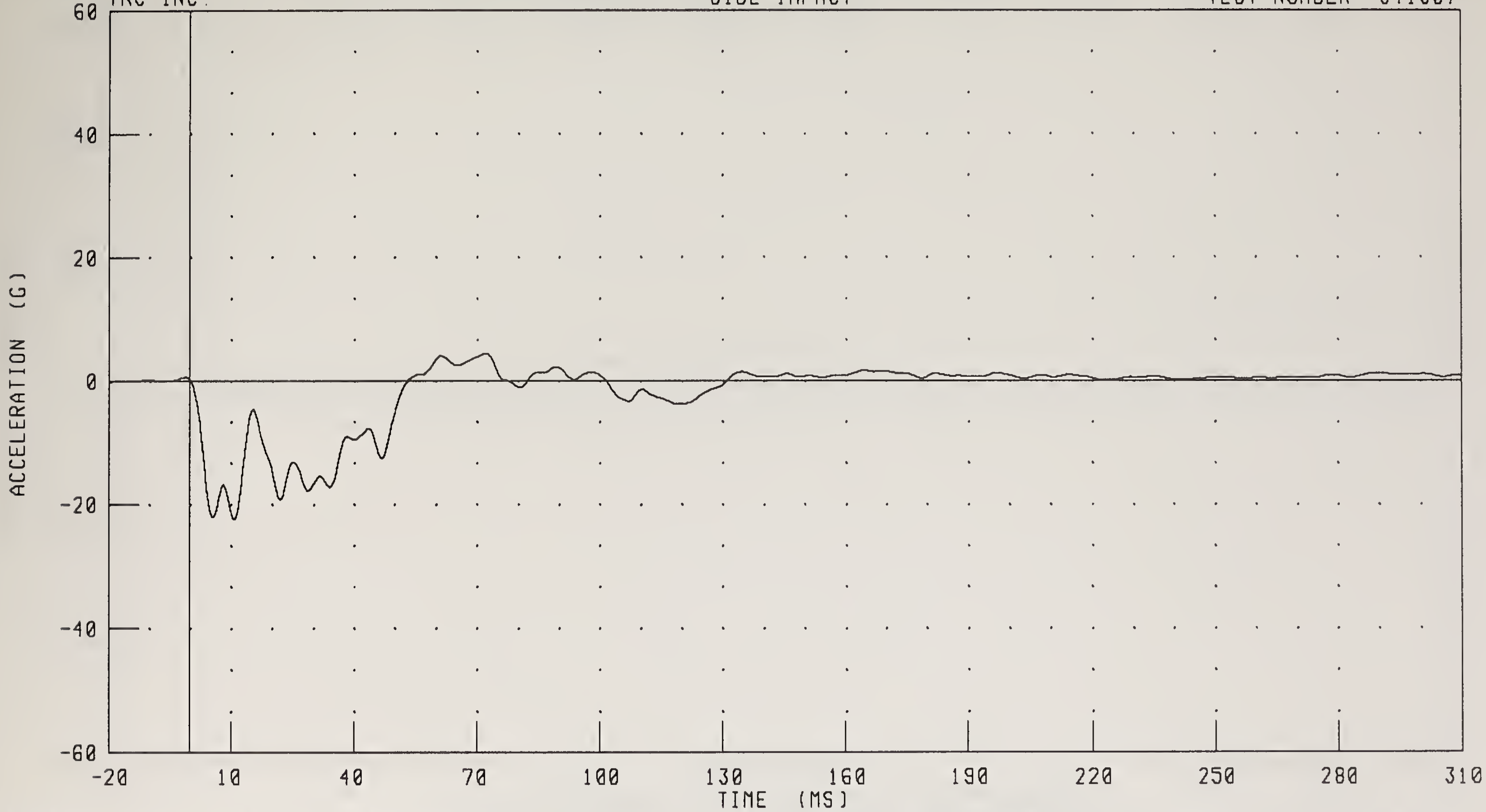
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY X-AXIS DISPLACEMENT



CHANNEL: VCGXD FILTER: CH. CLASS 180 PEAK DATA: 0.19 MM @ 7.20 MS; -316.80 MM @ 310.00 MS

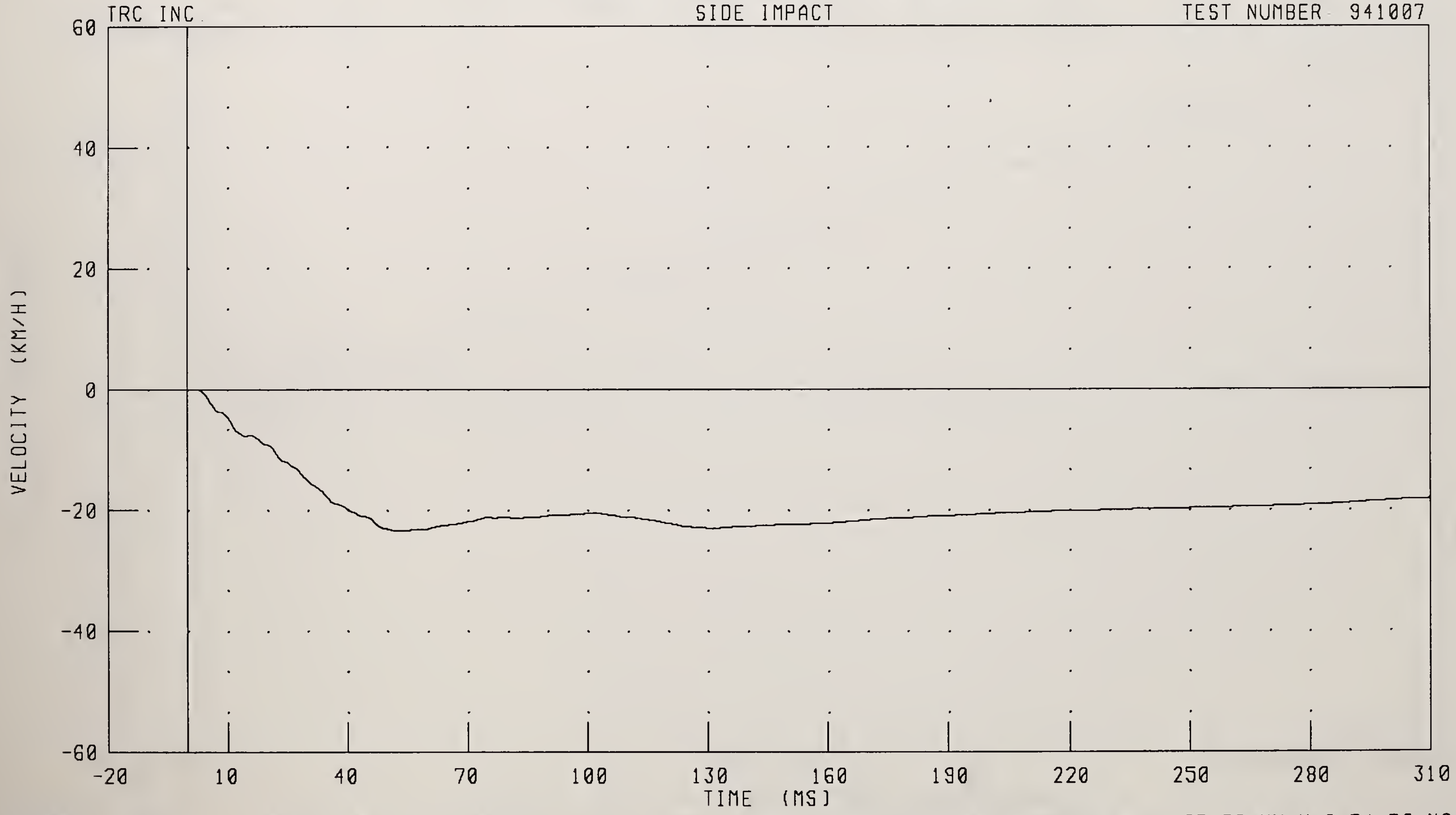
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Y-AXIS ACCELERATION

TRC INC. SIDE IMPACT TEST NUMBER 941007



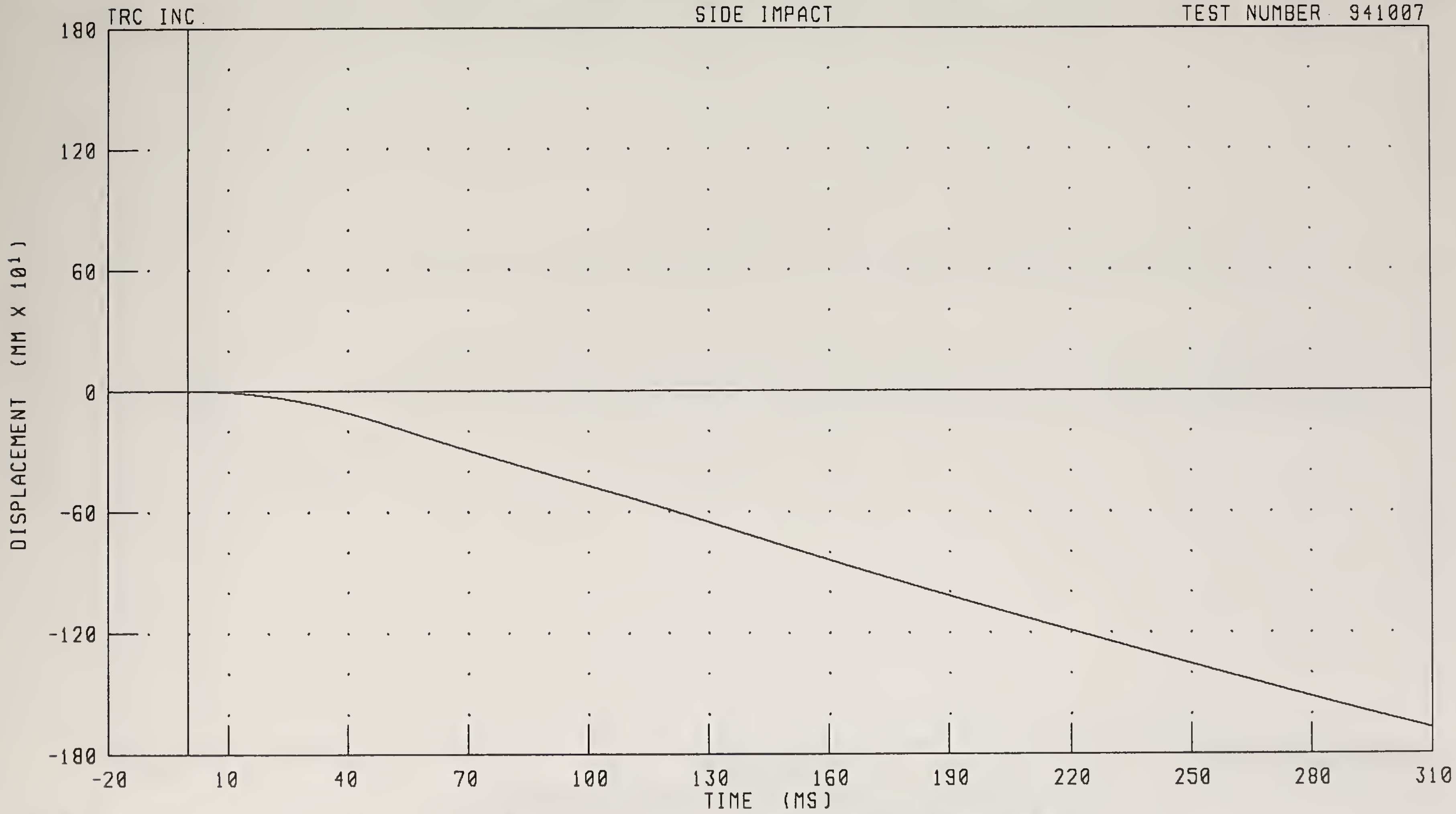
CHANNEL: VCGYG FILTER: CH. CLASS 60 PEAK DATA: 4.50 G @ 72.16 MS; -22.42 G @ 10.80 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Y-AXIS VELOCITY
SIDE IMPACT



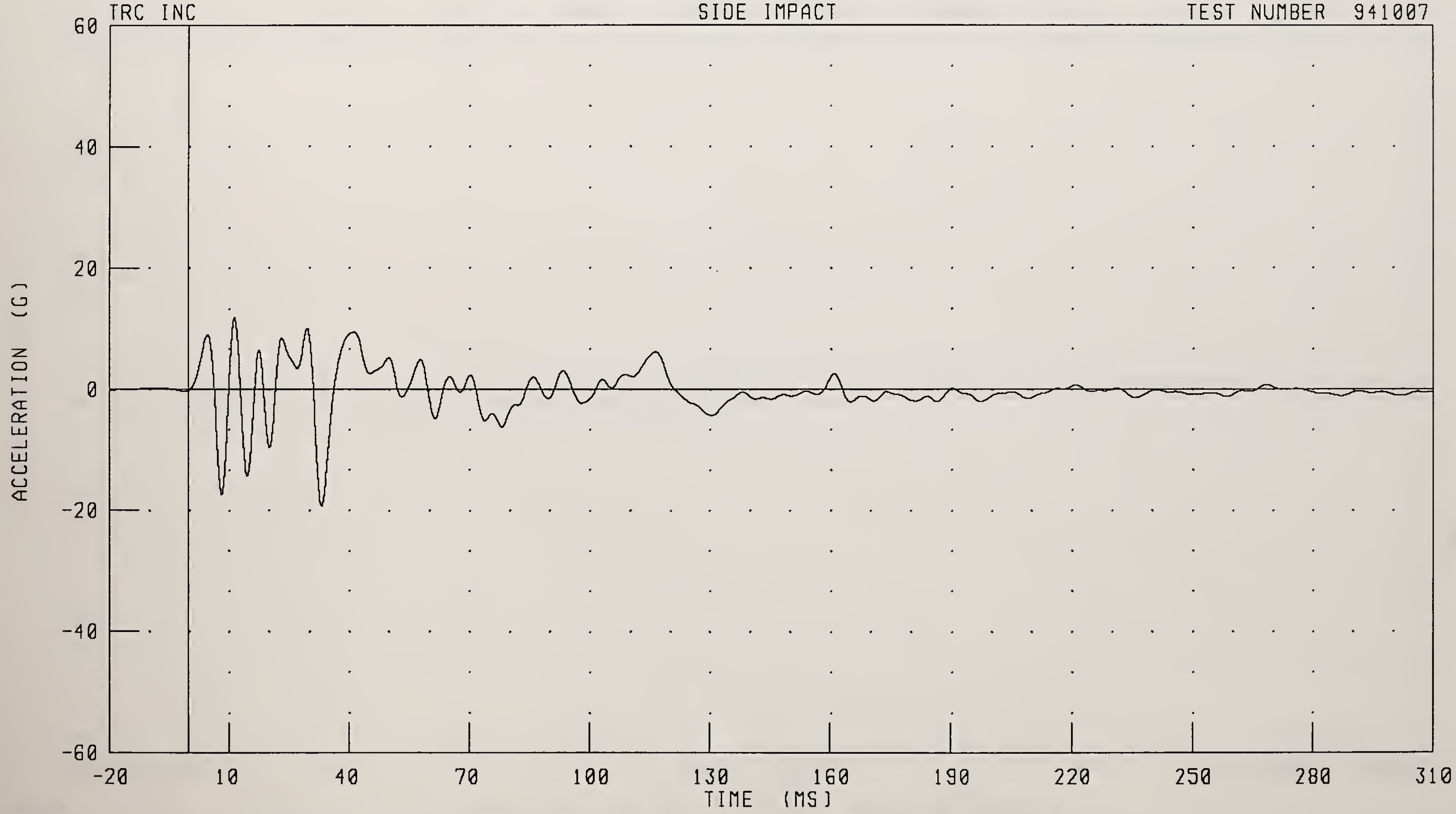
CHANNEL: VCGYV FILTER: CH. CLASS 180 PEAK DATA: 0.01 KM/H @ 2.00 MS; -23.36 KM/H @ 54.72 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Y-AXIS DISPLACEMENT



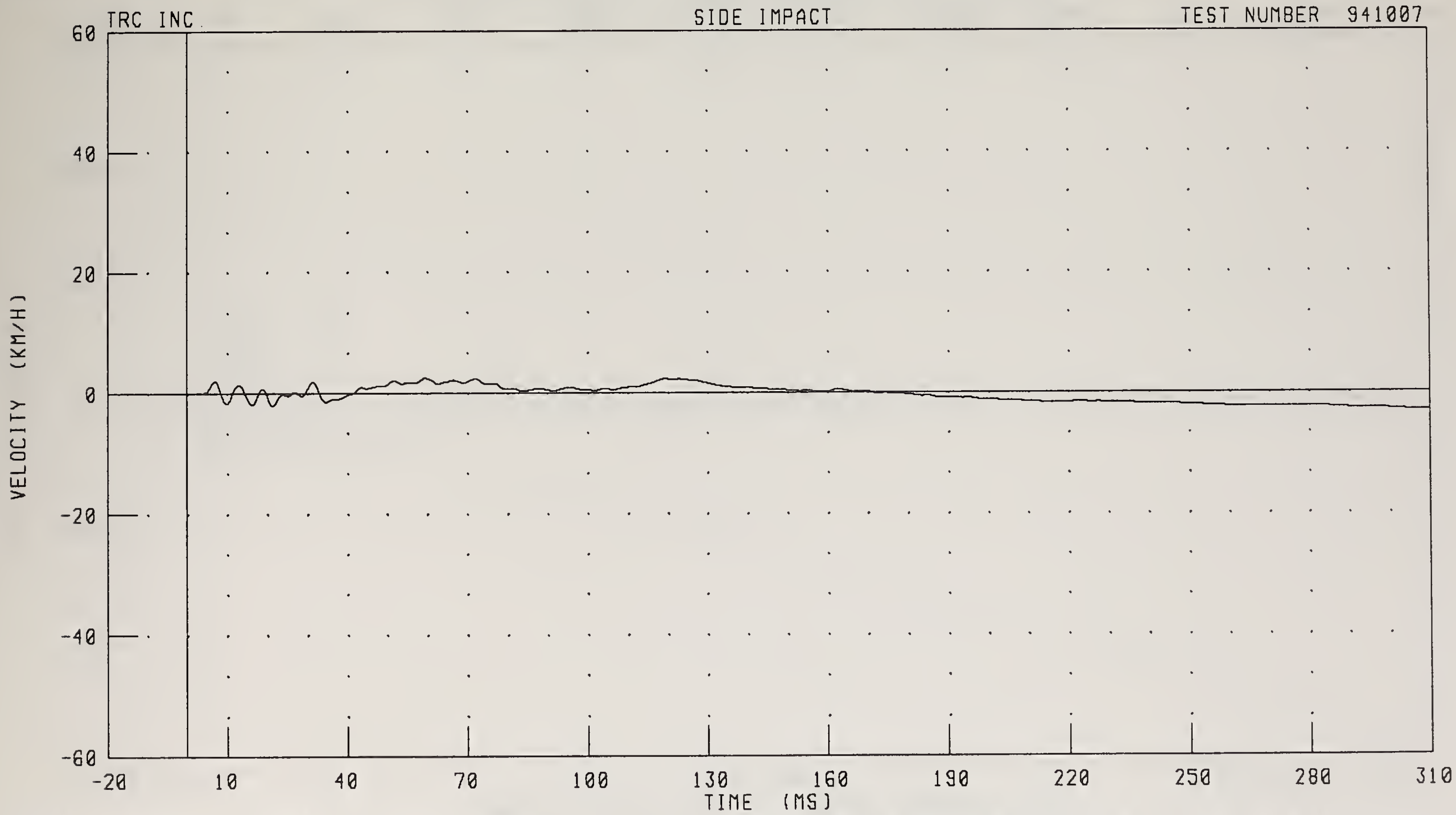
CHANNEL: VCGYD FILTER: CH. CLASS 180 PEAK DATA: 0.00 MM @ 2.32 MS; -1672.93 MM @ 310.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Z-AXIS ACCELERATION

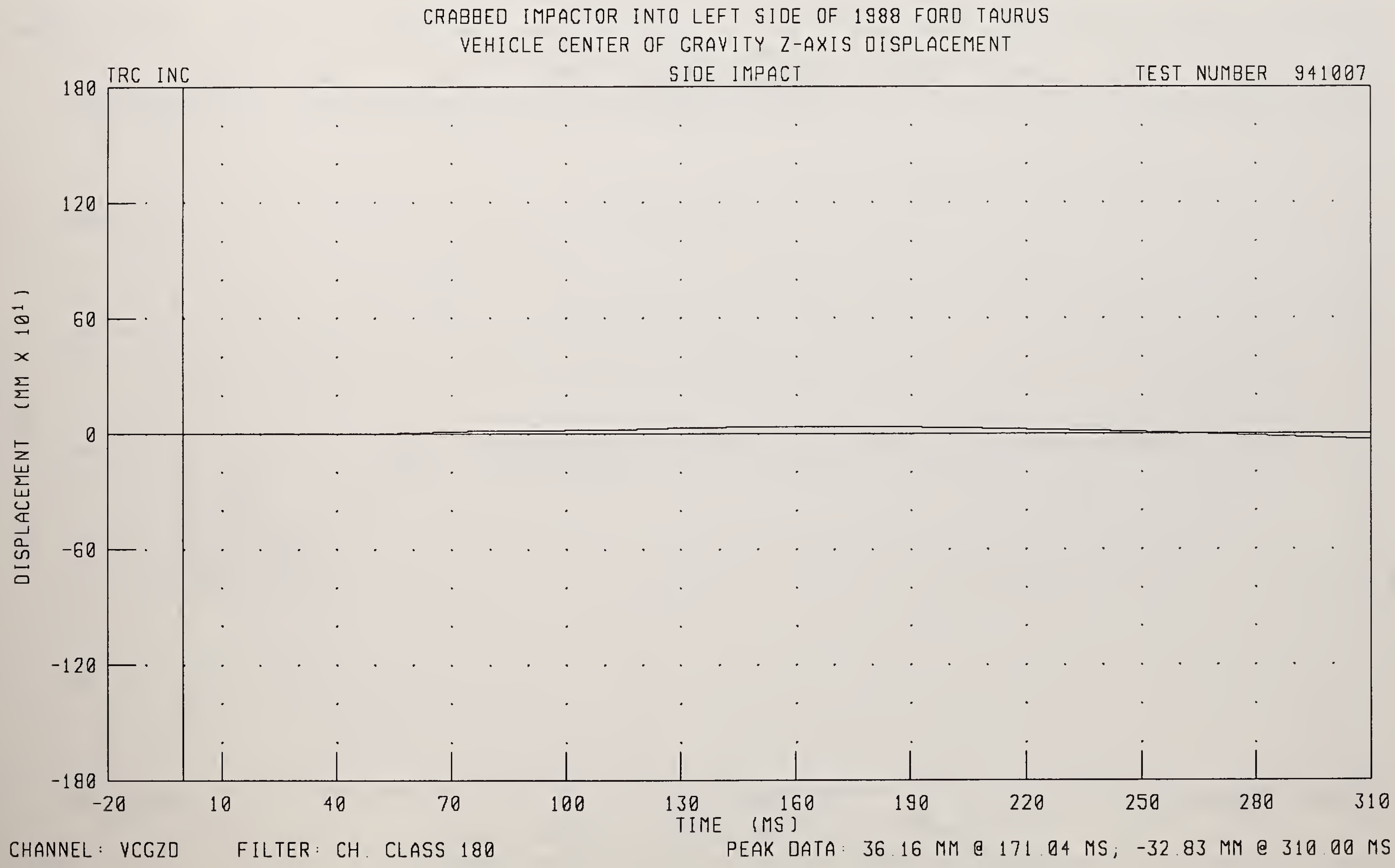


CHANNEL: VCGZG FILTER: CH. CLASS 60 PEAK DATA: 11.81 G @ 11.36 MS; -19.28 G @ 33.20 MS

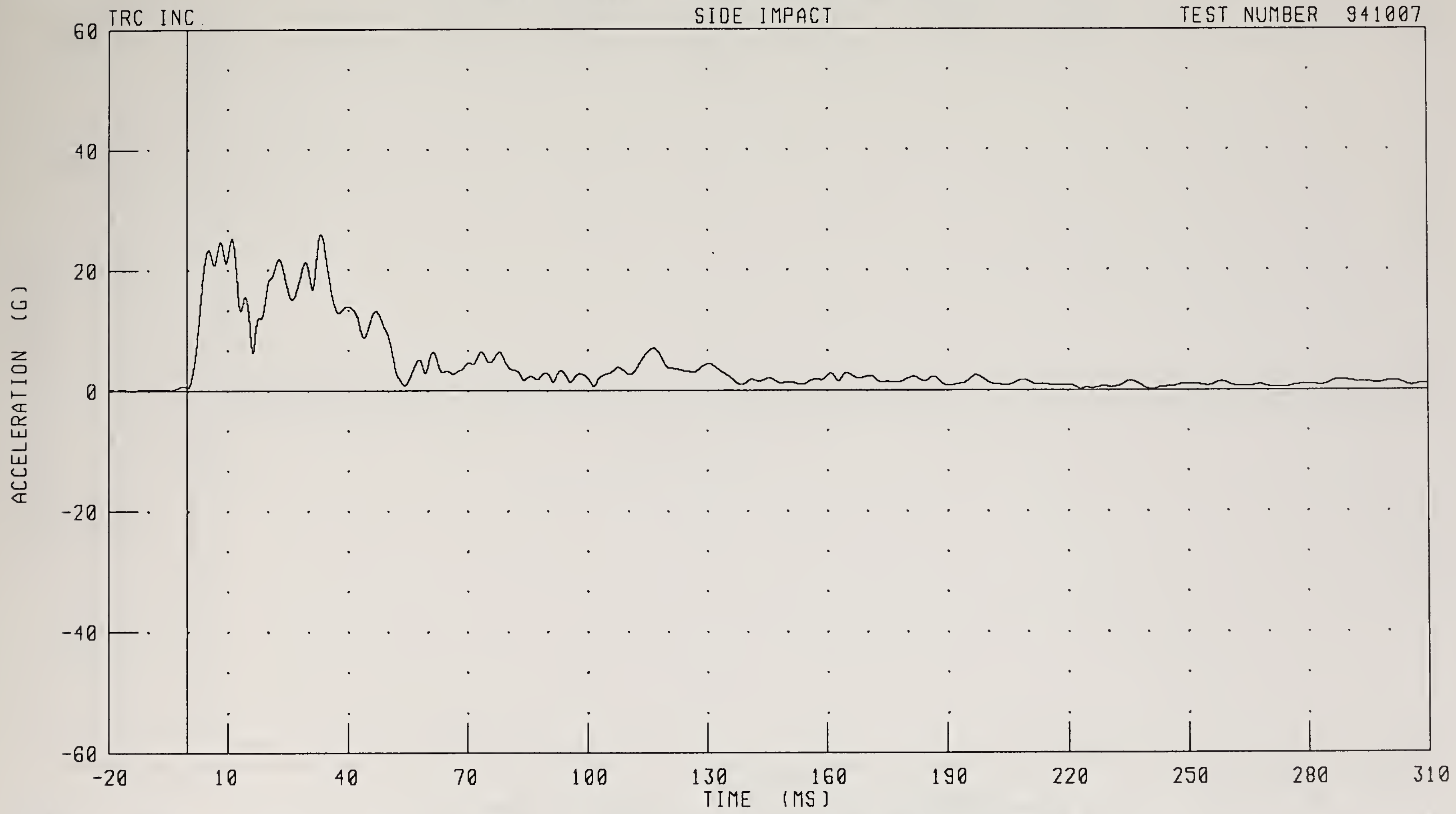
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Z-AXIS VELOCITY



CHANNEL: VCGZV FILTER: CH. CLASS 180 PEAK DATA: 2.50 KM/H @ 59.52 MS; -3.05 KM/H @ 310.00 MS

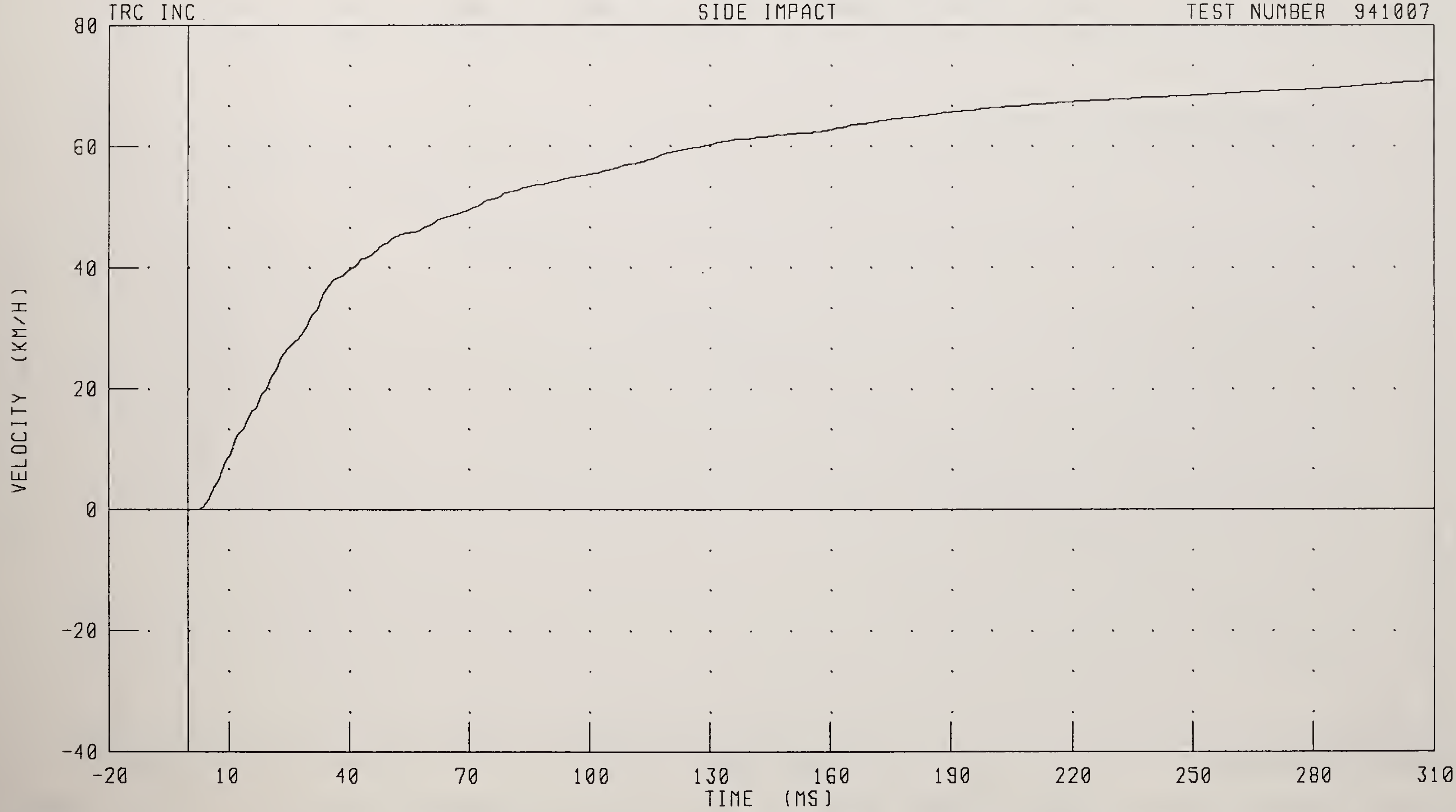

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY Z-AXIS DISPLACEMENT
TRC INC
SIDE IMPACT
TEST NUMBER 941007
DISPLACEMENT (MM X 10^1)
180
120
60
0
-60
-120
-180
-20
10
40
70
100
130
160
190
220
250
280
310
TIME (MS)
CHANNEL: VCGZD
FILTER: CH. CLASS 180
PEAK DATA: 36.16 MM @ 171.04 MS; -32.83 MM @ 310.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION



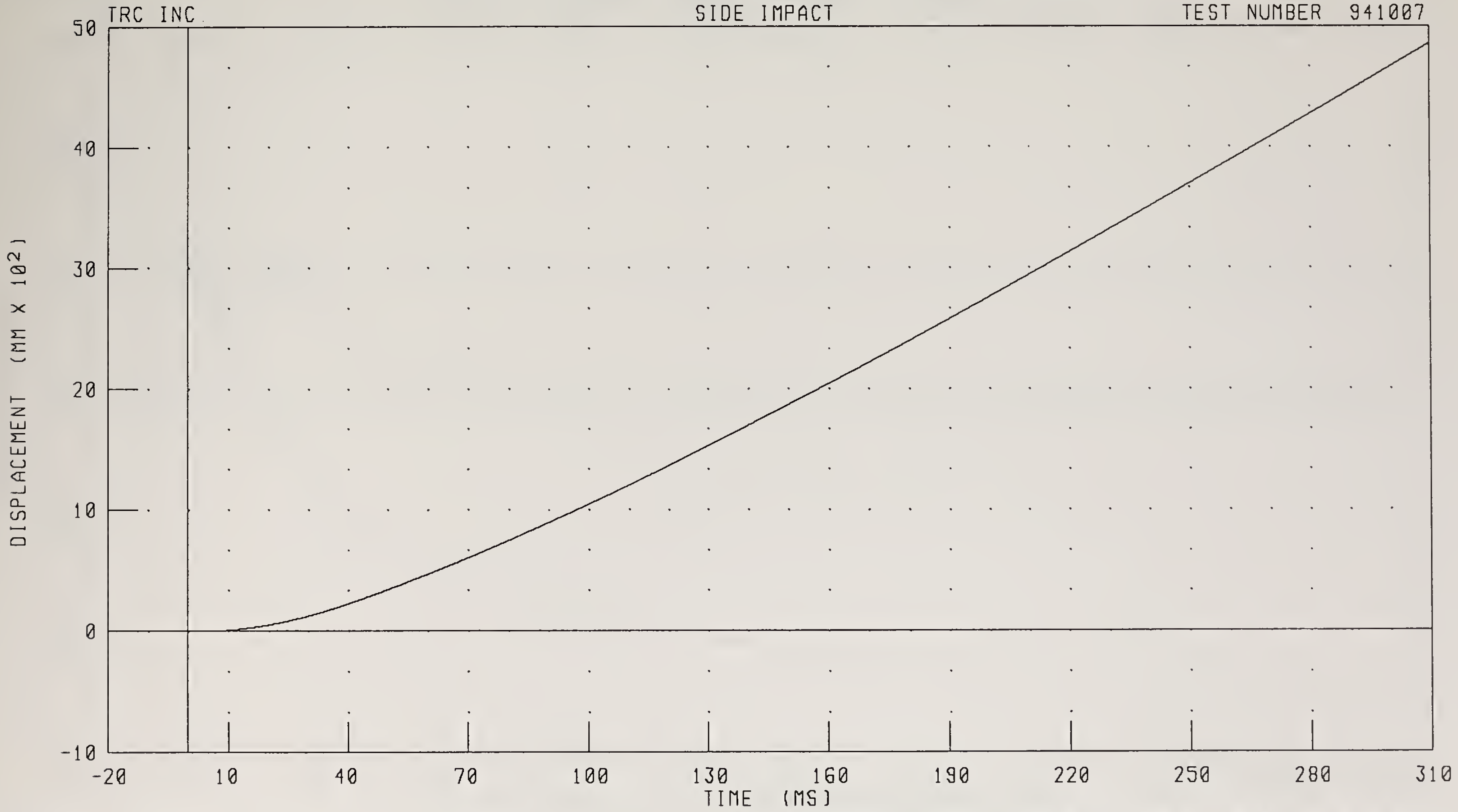
CHANNEL: VCGRG FILTER: CH. CLASS 60 PEAK DATA: 25.99 G @ 33.28 MS; 0.04 G @ -14.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY RESULTANT VELOCITY



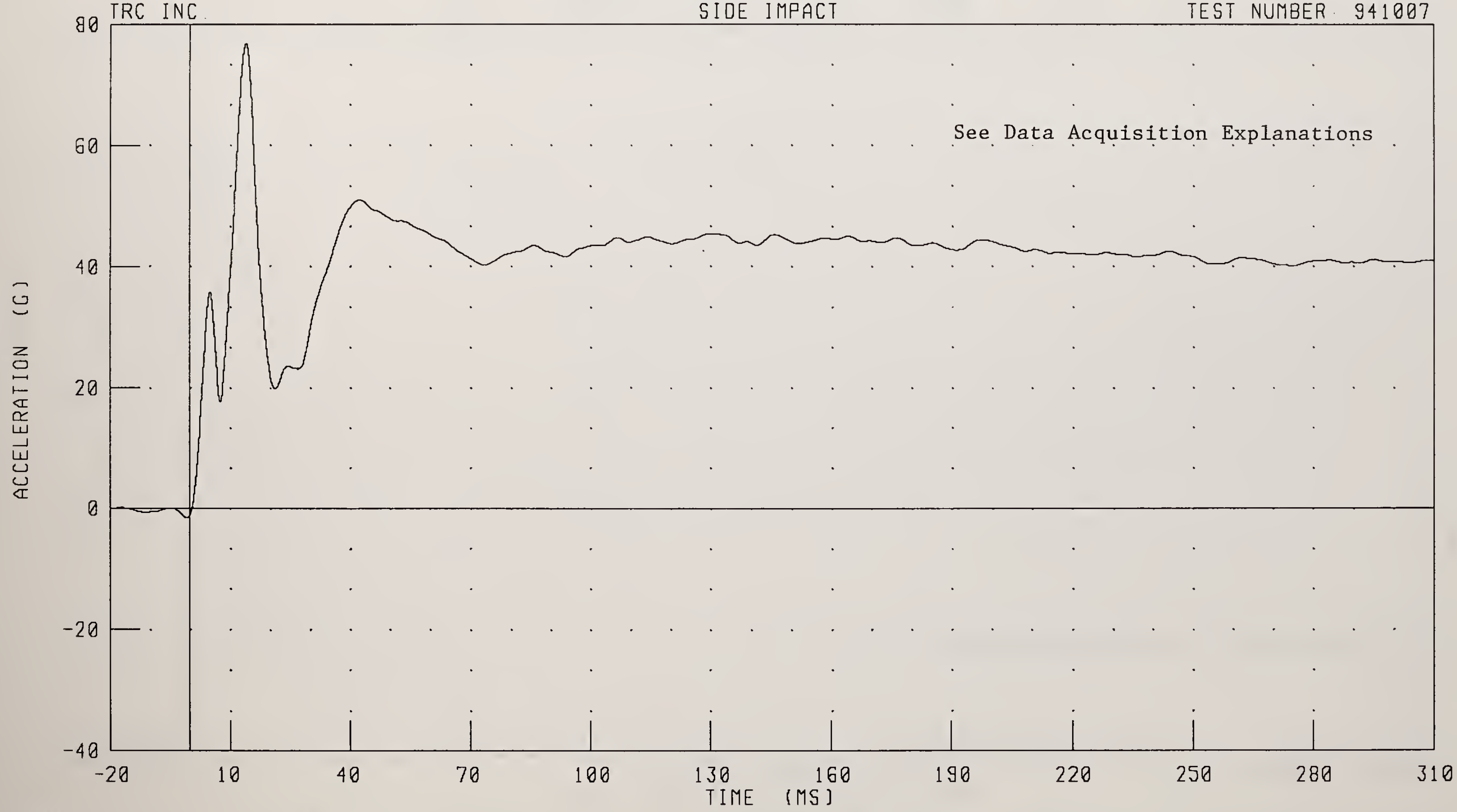
CHANNEL: VCGRV FILTER: CH. CLASS 180 PEAK DATA: 70.86 KM/H @ 310.00 MS, 0.00 KM/H @ 0.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
VEHICLE CENTER OF GRAVITY RESULTANT DISPLACEMENT



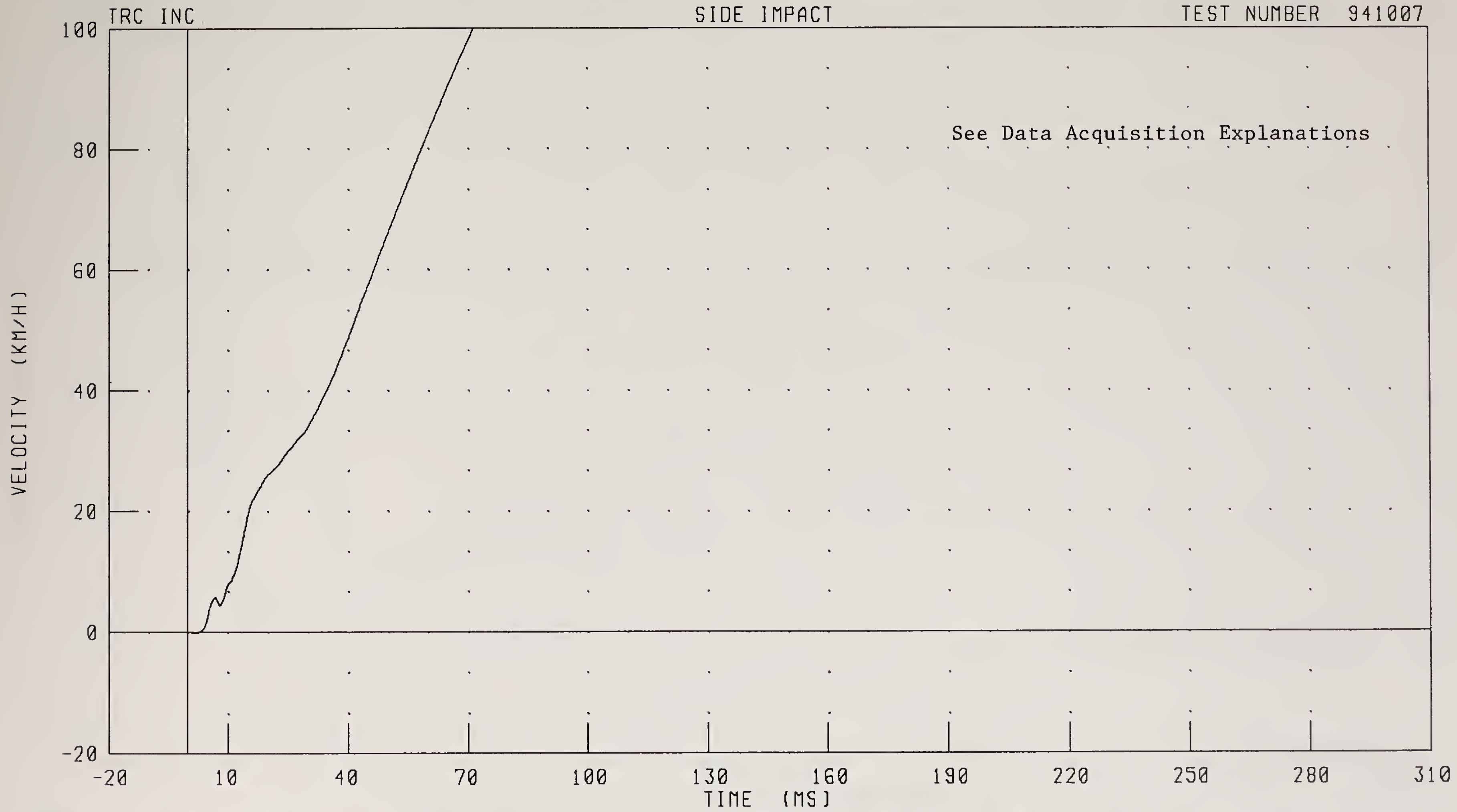
CHANNEL: VCGRD FILTER: CH. CLASS 180 PEAK DATA: 4855.65 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL X-AXIS ACCELERATION



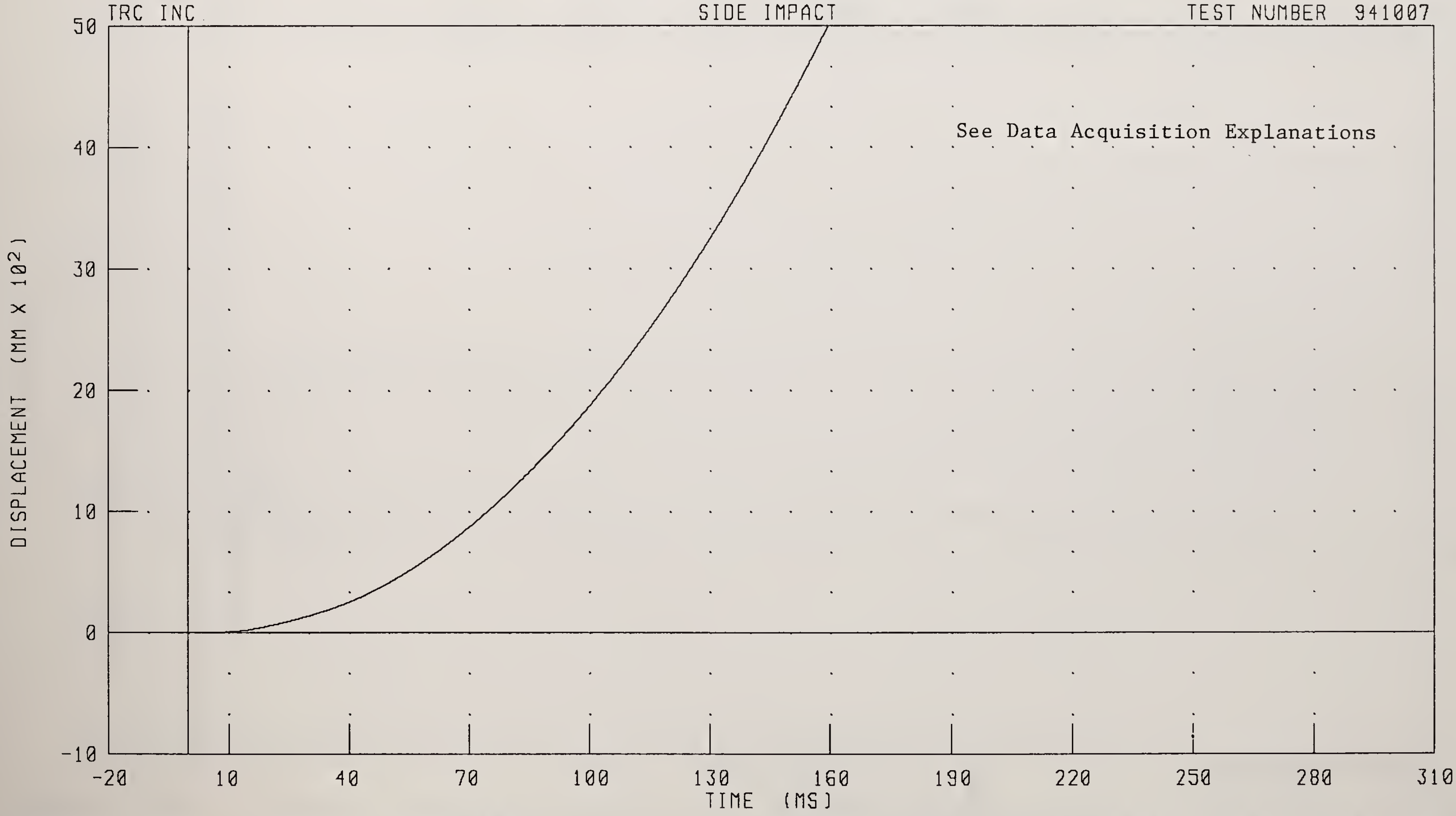
CHANNEL: LFSXG FILTER: CH. CLASS 60 PEAK DATA: 76.78 G @ 13.84 MS; -1.53 G @ -0.88 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL X-AXIS VELOCITY



CHANNEL: LFSXV FILTER: CH. CLASS 180 PEAK DATA: 460.20 KM/H @ 310.00 MS; -0.18 KM/H @ 2.00 MS

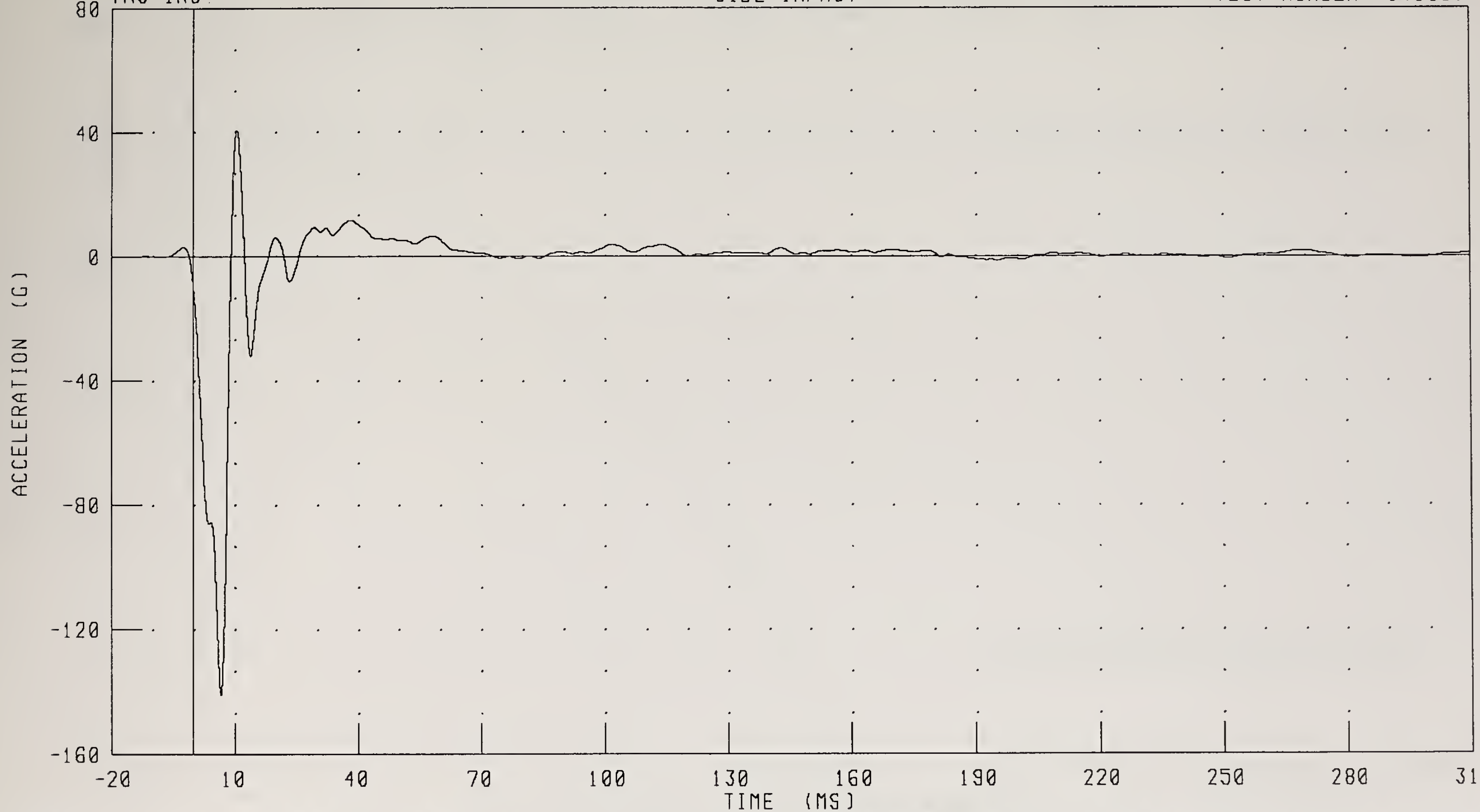
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL X-AXIS DISPLACEMENT



CHANNEL: LFSXD FILTER: CH. CLASS 180 PEAK DATA: 19632.82 MM @ 310.00 MS; -0.06 MM @ 2.72 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL Y-AXIS ACCELERATION

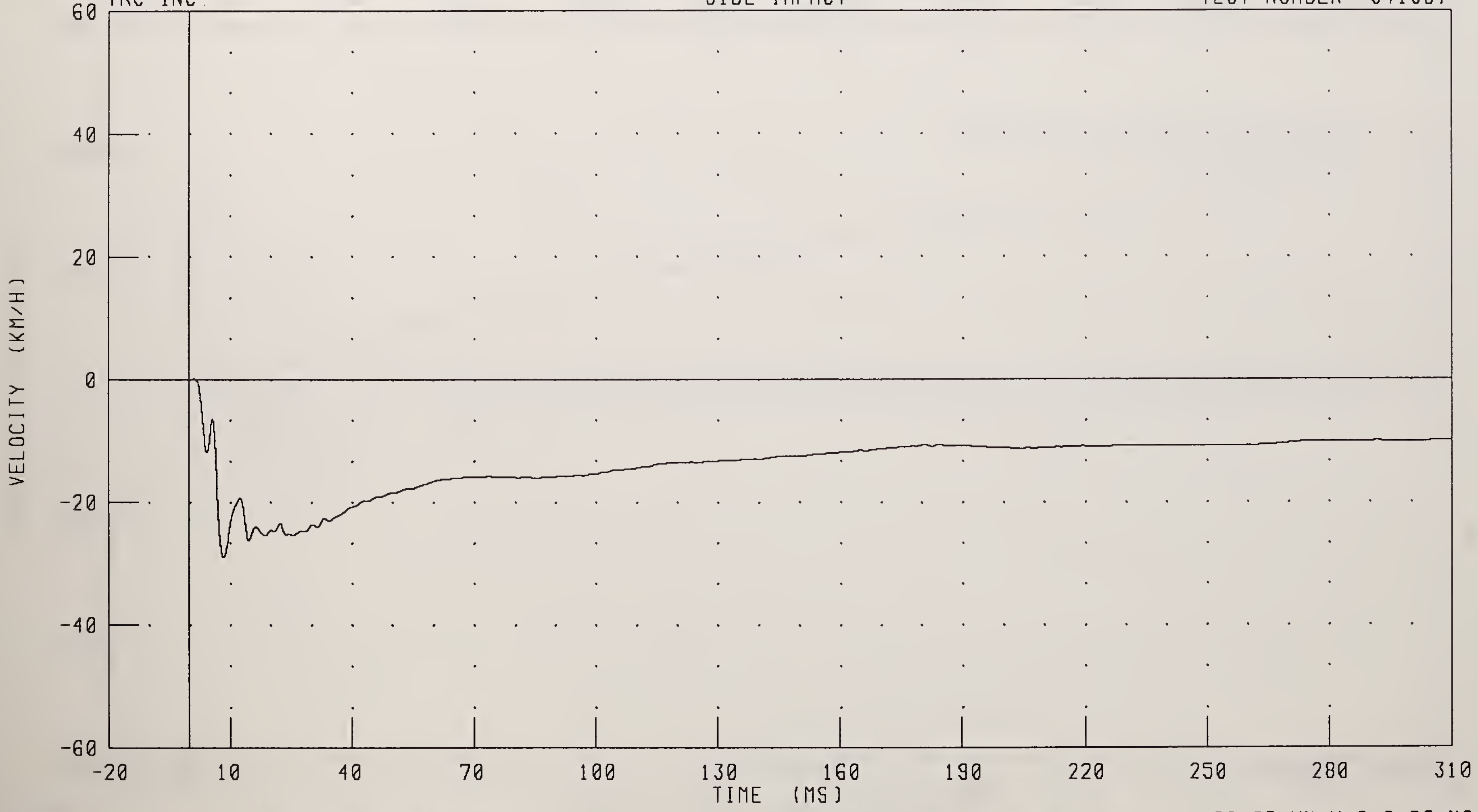
TRC INC. SIDE IMPACT TEST NUMBER 941007



CHANNEL: LFSYG FILTER: CH. CLASS 60 PEAK DATA: 40.79 G @ 10.48 MS; -141.03 G @ 6.56 MS

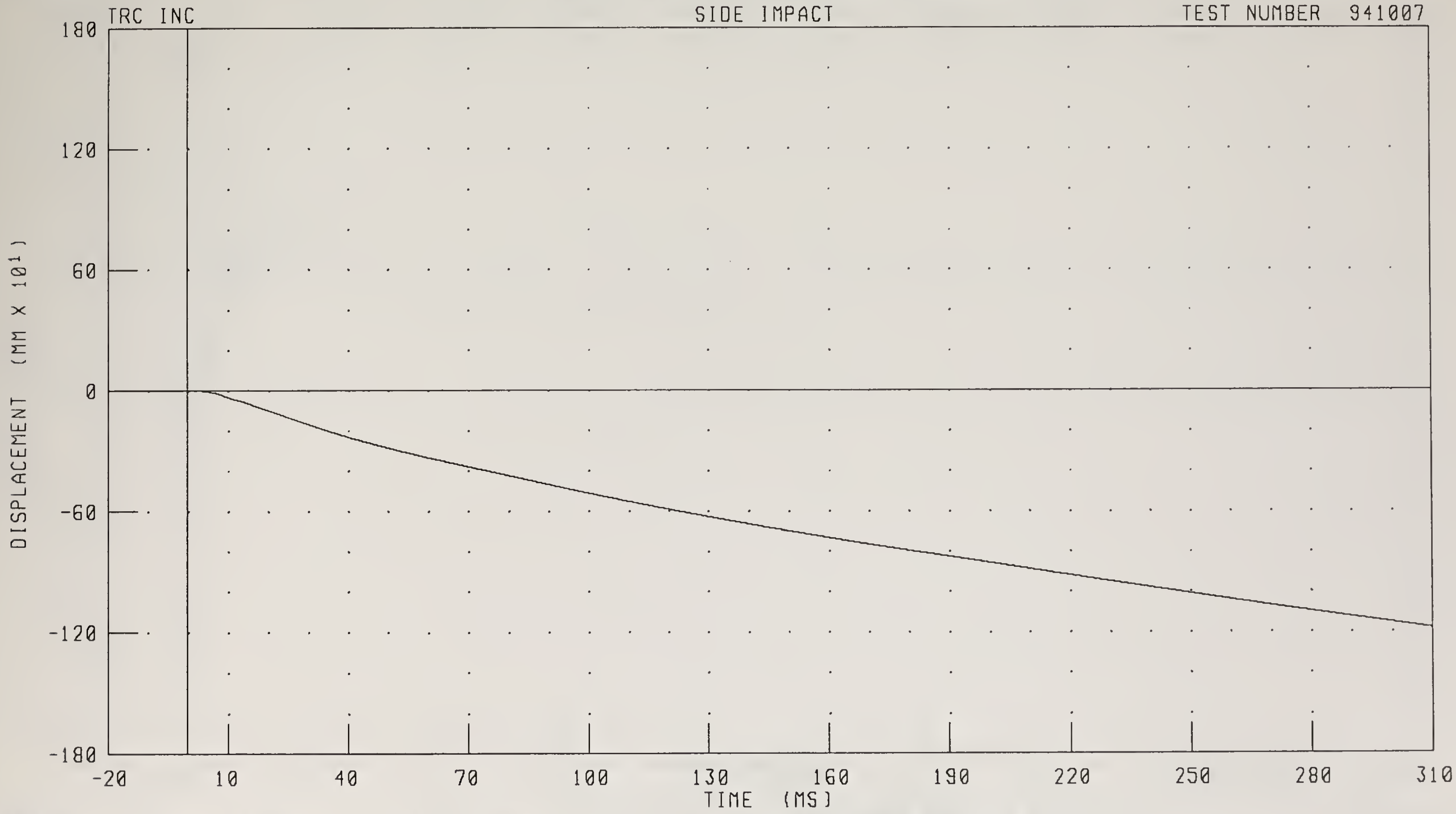
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL Y-AXIS VELOCITY

TRC INC. SIDE IMPACT TEST NUMBER 941007



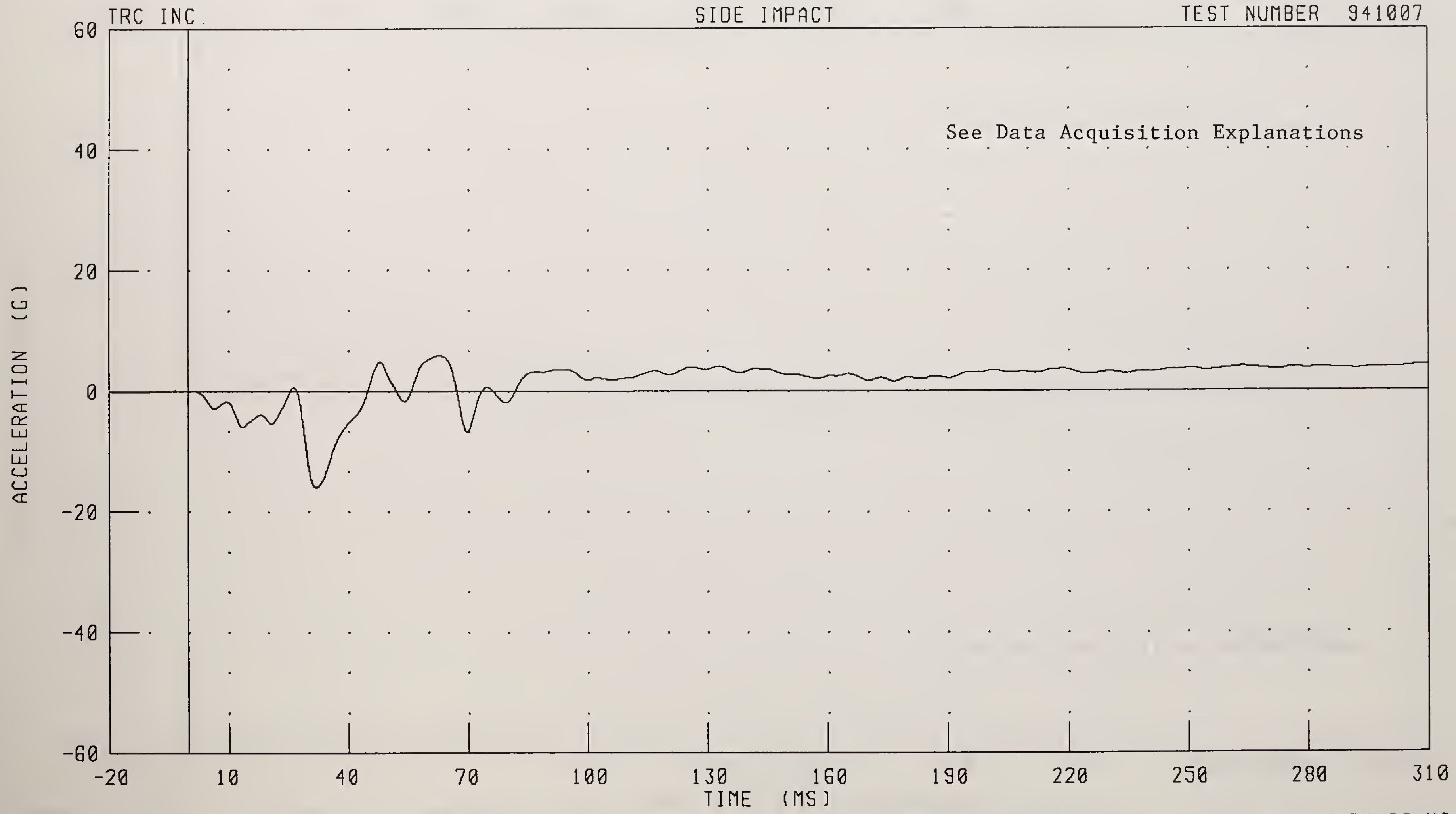
CHANNEL: LFSYV FILTER: CH. CLASS 180 PEAK DATA: 0.13 KM/H @ 1.20 MS; -29.03 KM/H @ 8.32 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT FRONT SILL Y-AXIS DISPLACEMENT



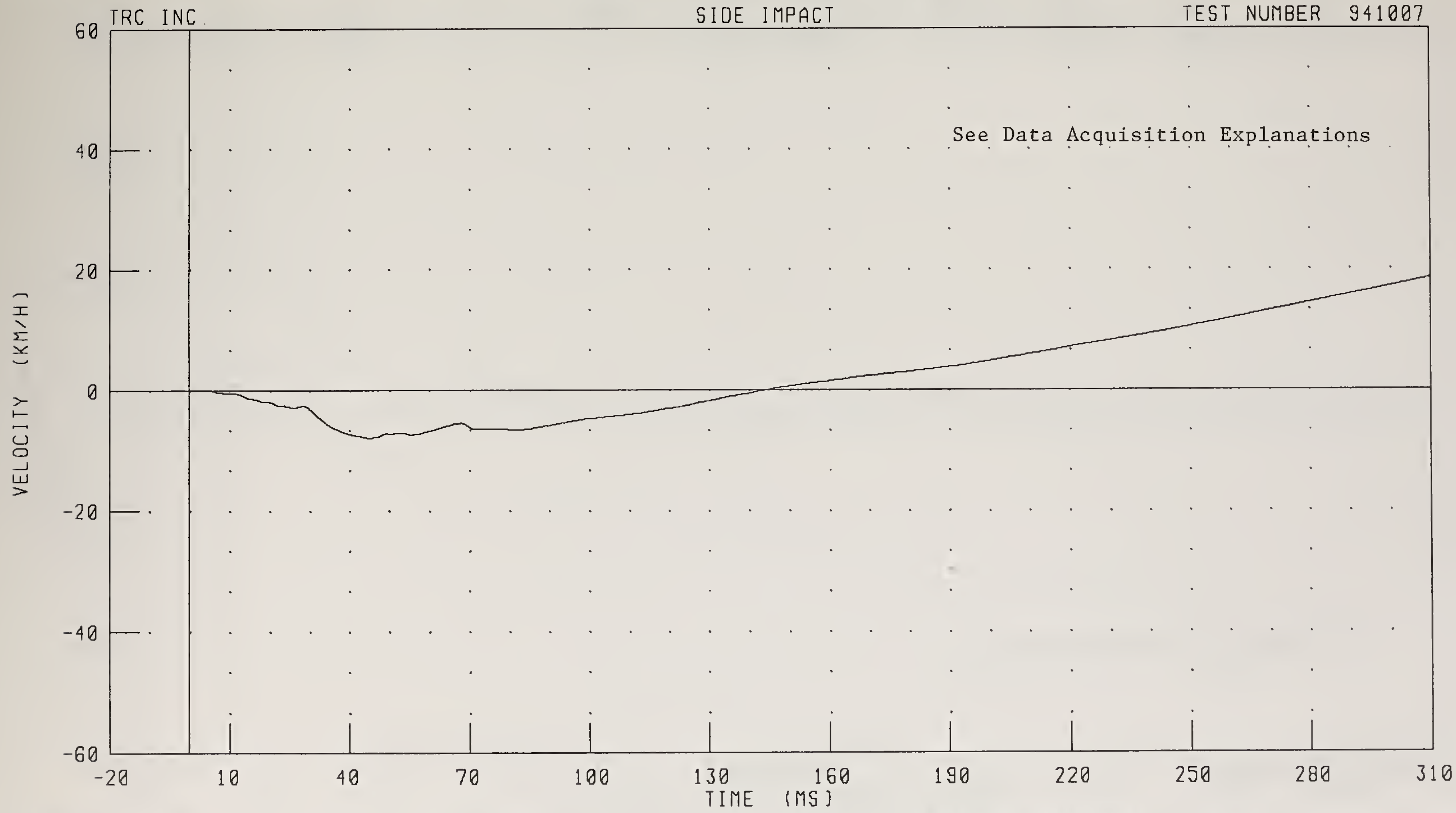
CHANNEL: LFSYD FILTER: CH. CLASS 180 PEAK DATA: 0.03 MM @ 1.68 MS, -1181.66 MM @ 310.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL X-AXIS ACCELERATION



CHANNEL: RFSXG FILTER: CH. CLASS 60 PEAK DATA: 5.90 G @ 62.80 MS, -16.00 G @ 31.92 MS

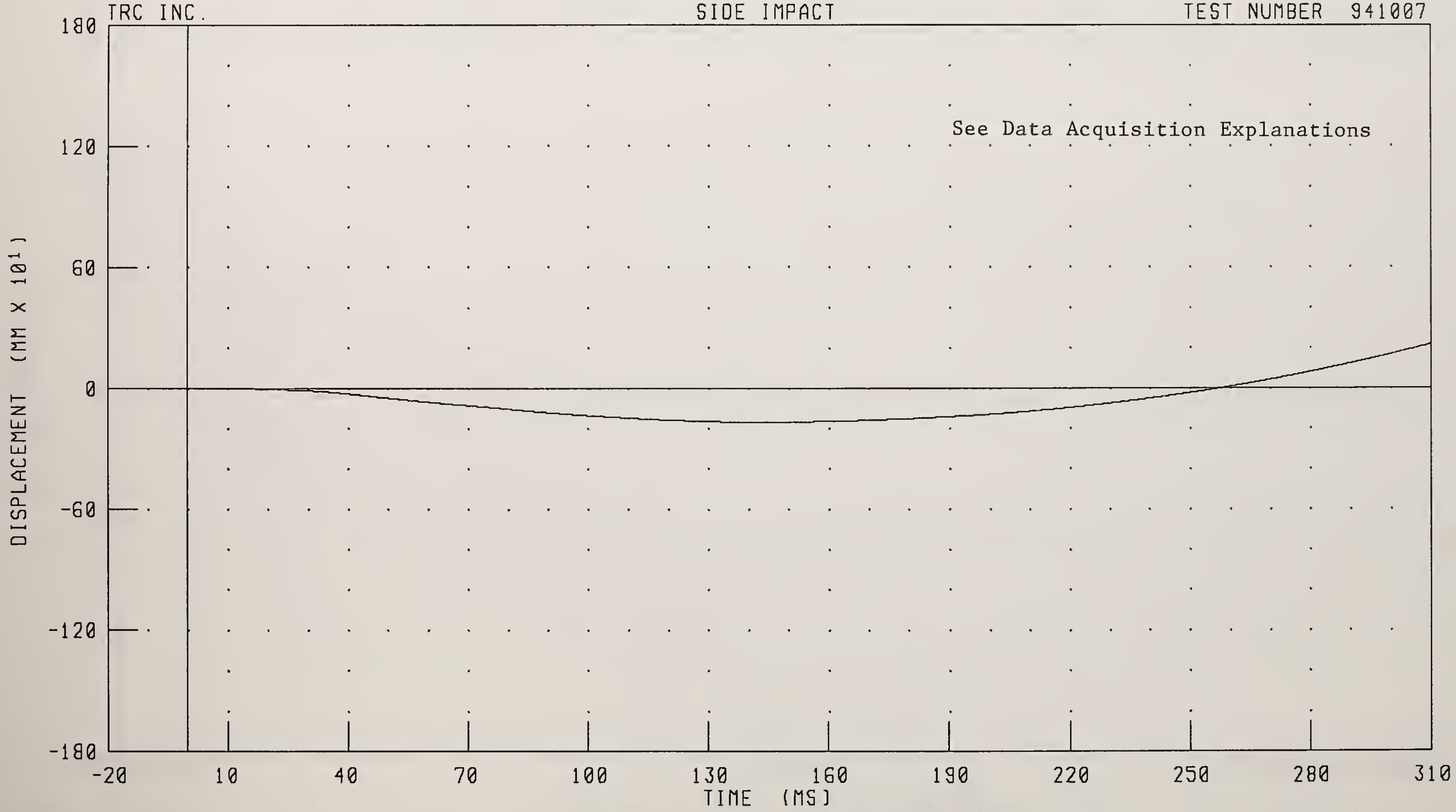
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL X-AXIS VELOCITY



CHANNEL: RFSXV FILTER: CH. CLASS 180

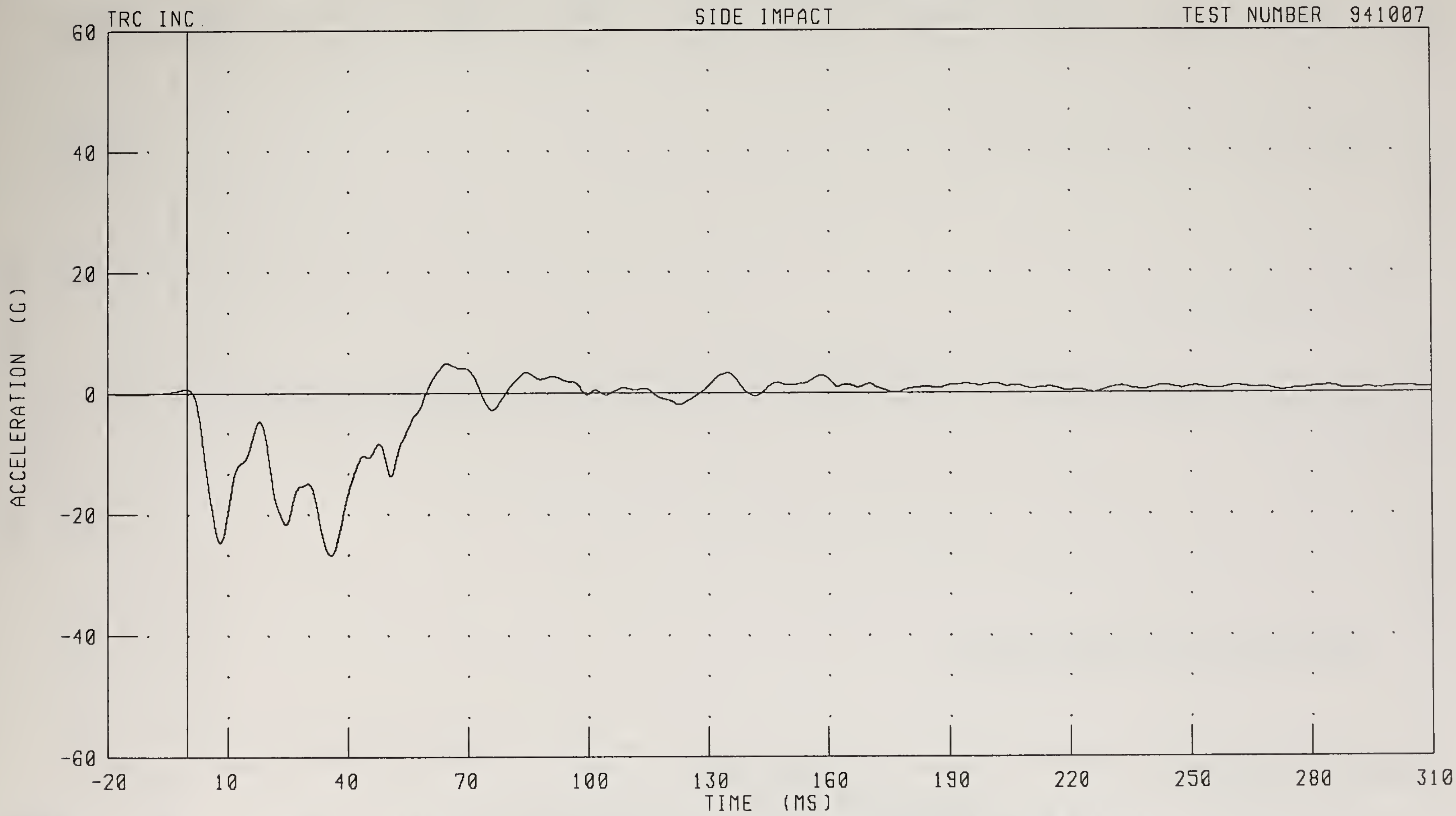
PEAK DATA: 18.60 KM/H @ 310.00 MS; -7.89 KM/H @ 45.12 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL X-AXIS DISPLACEMENT



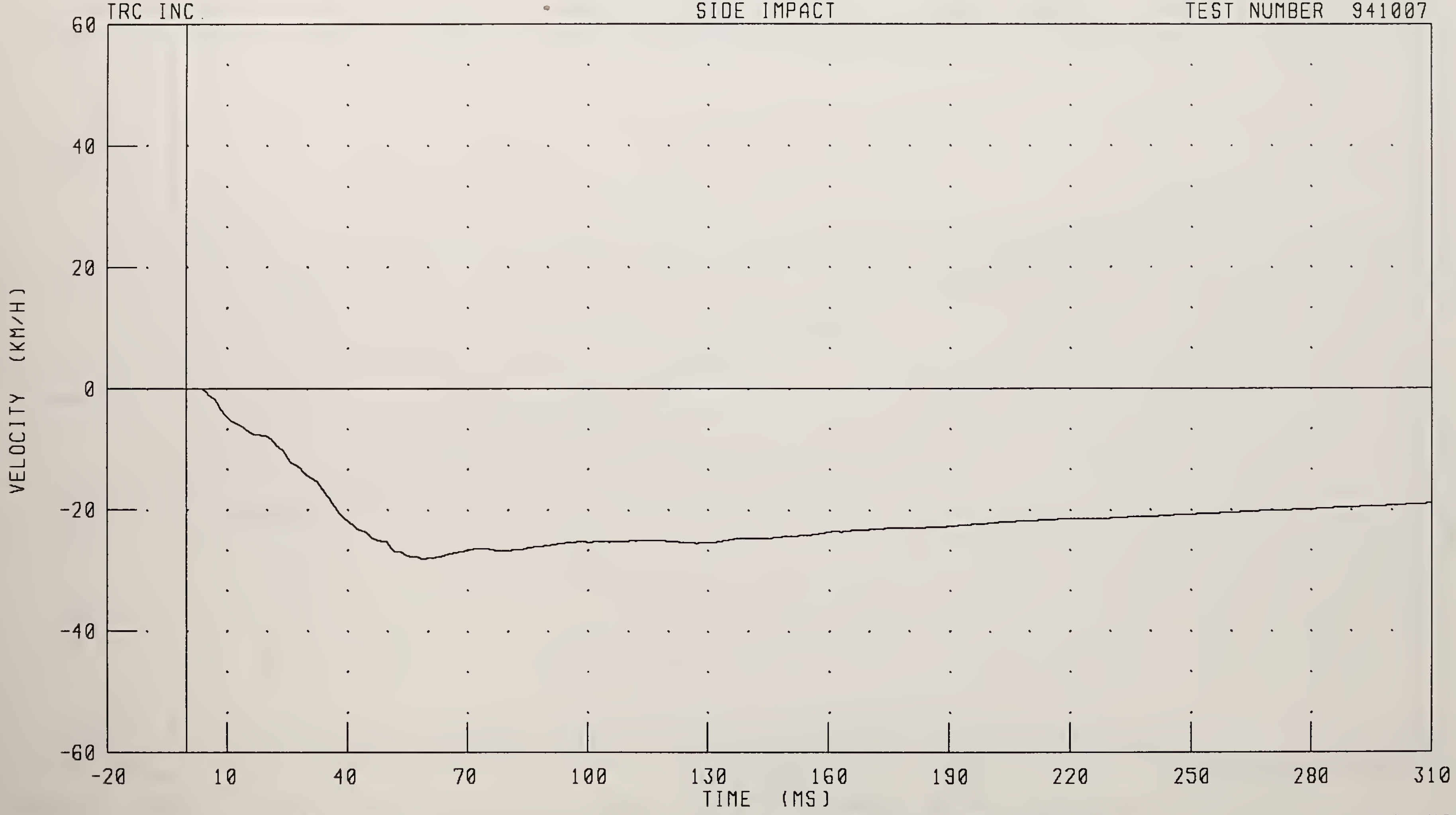
CHANNEL: RFSXD FILTER: CH. CLASS 180 PEAK DATA: 218.43 MM @ 310.00 MS; -166.87 MM @ 144.40 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL Y-AXIS ACCELERATION



CHANNEL: RFSYG FILTER: CH. CLASS 60 PEAK DATA: 4.90 G @ 64.64 MS; -26.81 G @ 35.76 MS

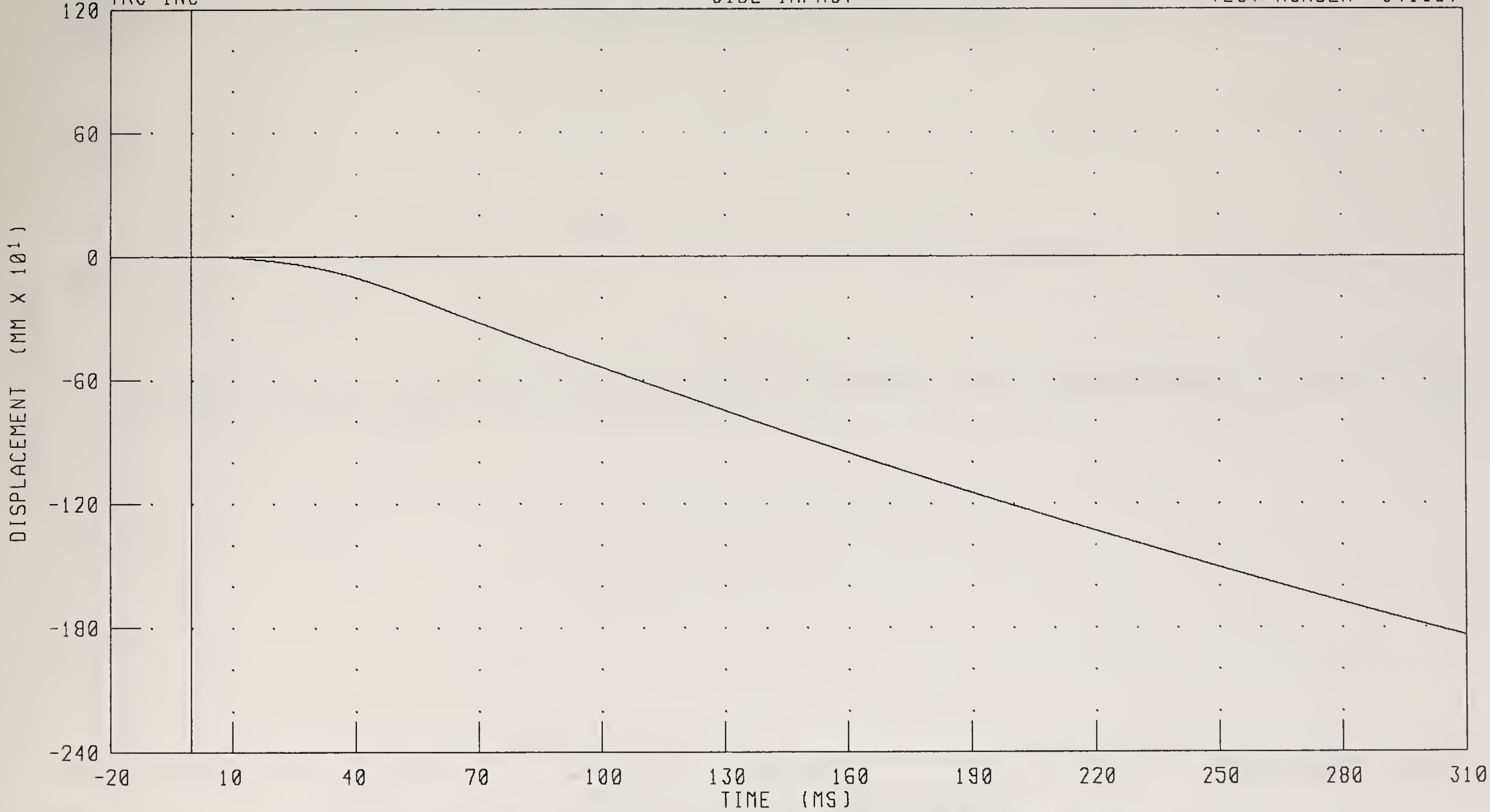
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL Y-AXIS VELOCITY



CHANNEL: RFSYV FILTER: CH. CLASS 180 PEAK DATA: 0.03 KM/H @ 3.04 MS; -28.12 KM/H @ 58.88 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT FRONT SILL Y-AXIS DISPLACEMENT

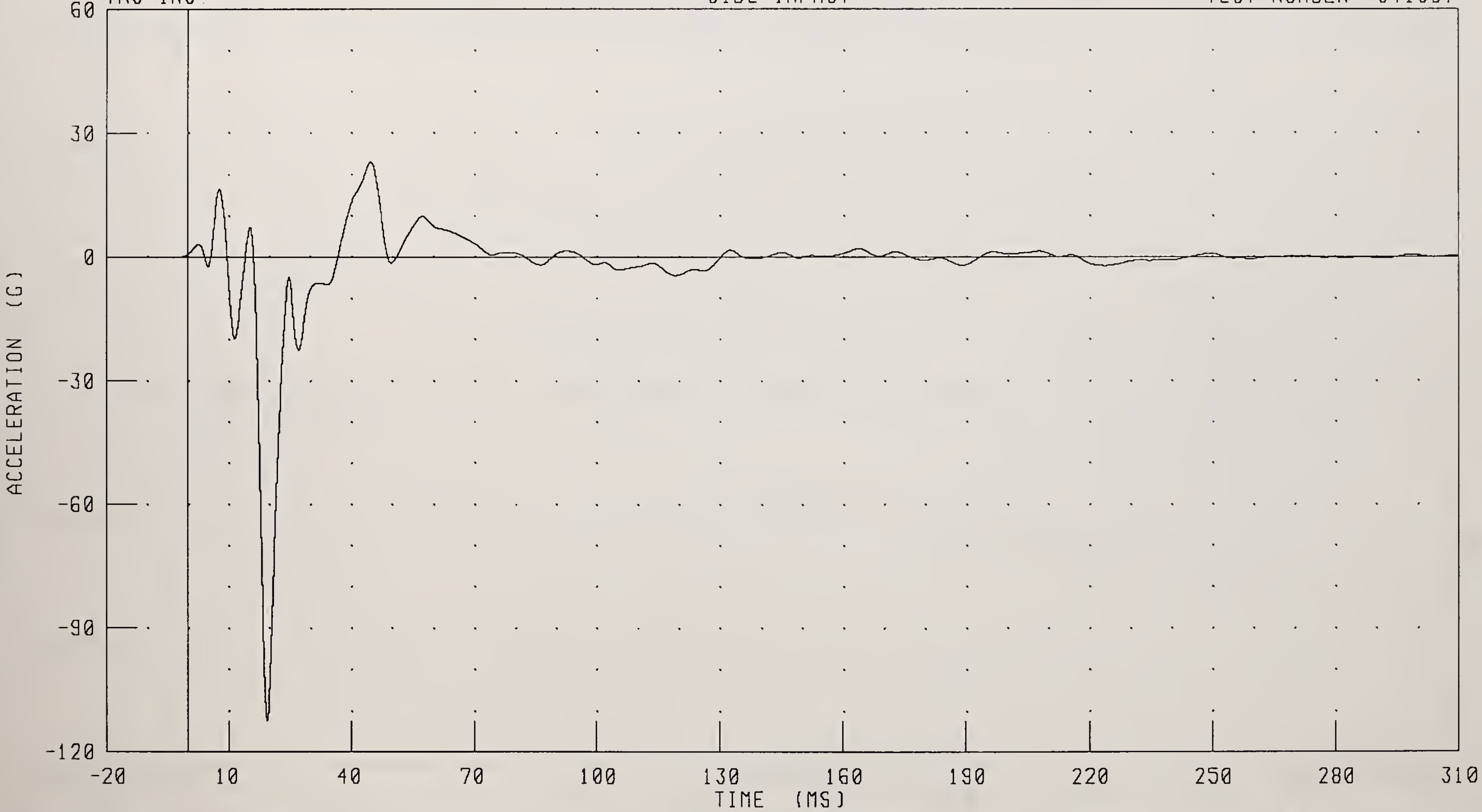
TRC INC SIDE IMPACT TEST NUMBER 941007



CHANNEL: RFSYD FILTER: CH. CLASS 180 PEAK DATA: 0.01 MM @ 3.60 MS; -1838.95 MM @ 310.00 MS

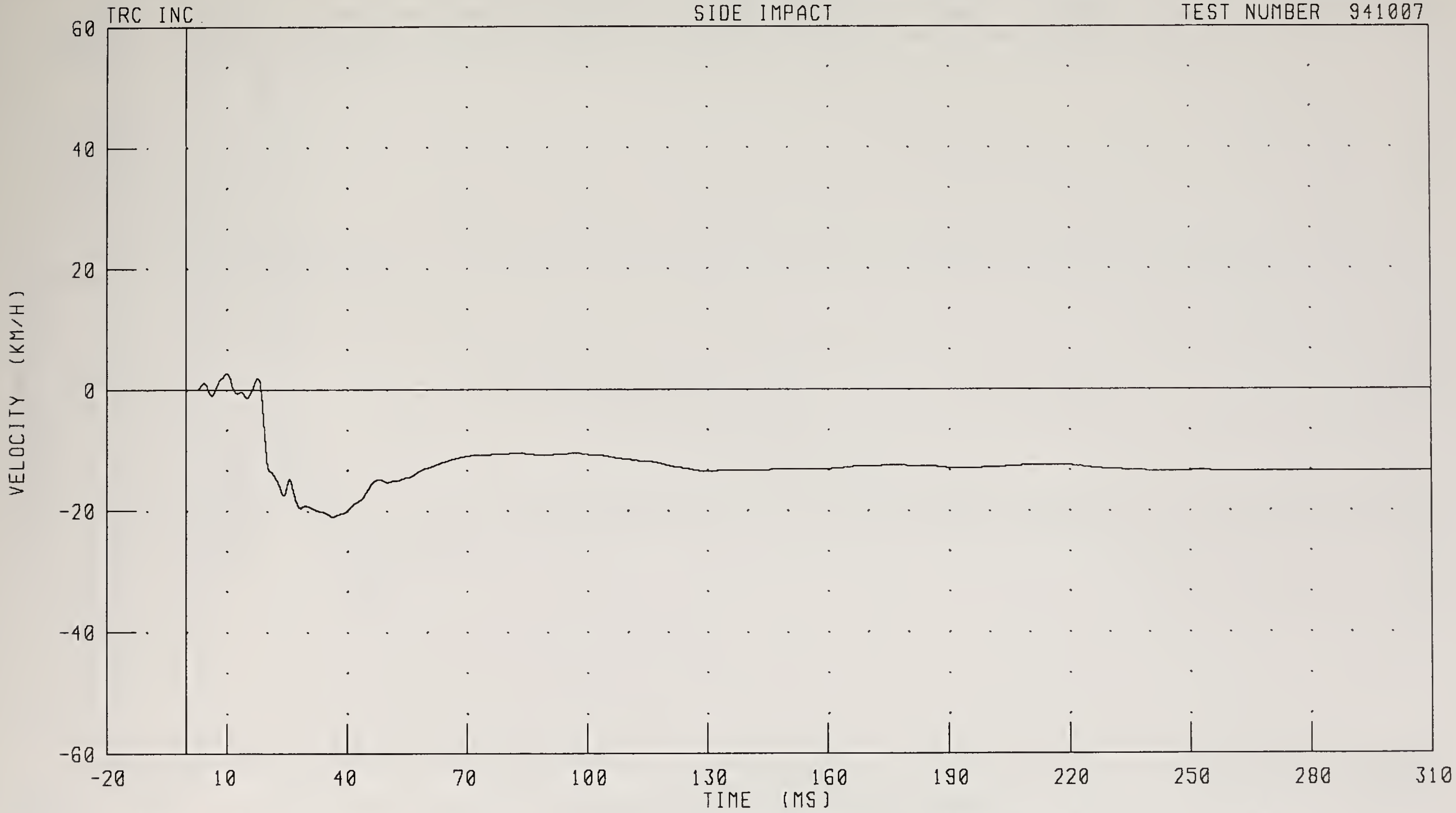
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT X-AXIS ACCELERATION

TRC INC. SIDE IMPACT TEST NUMBER 941007



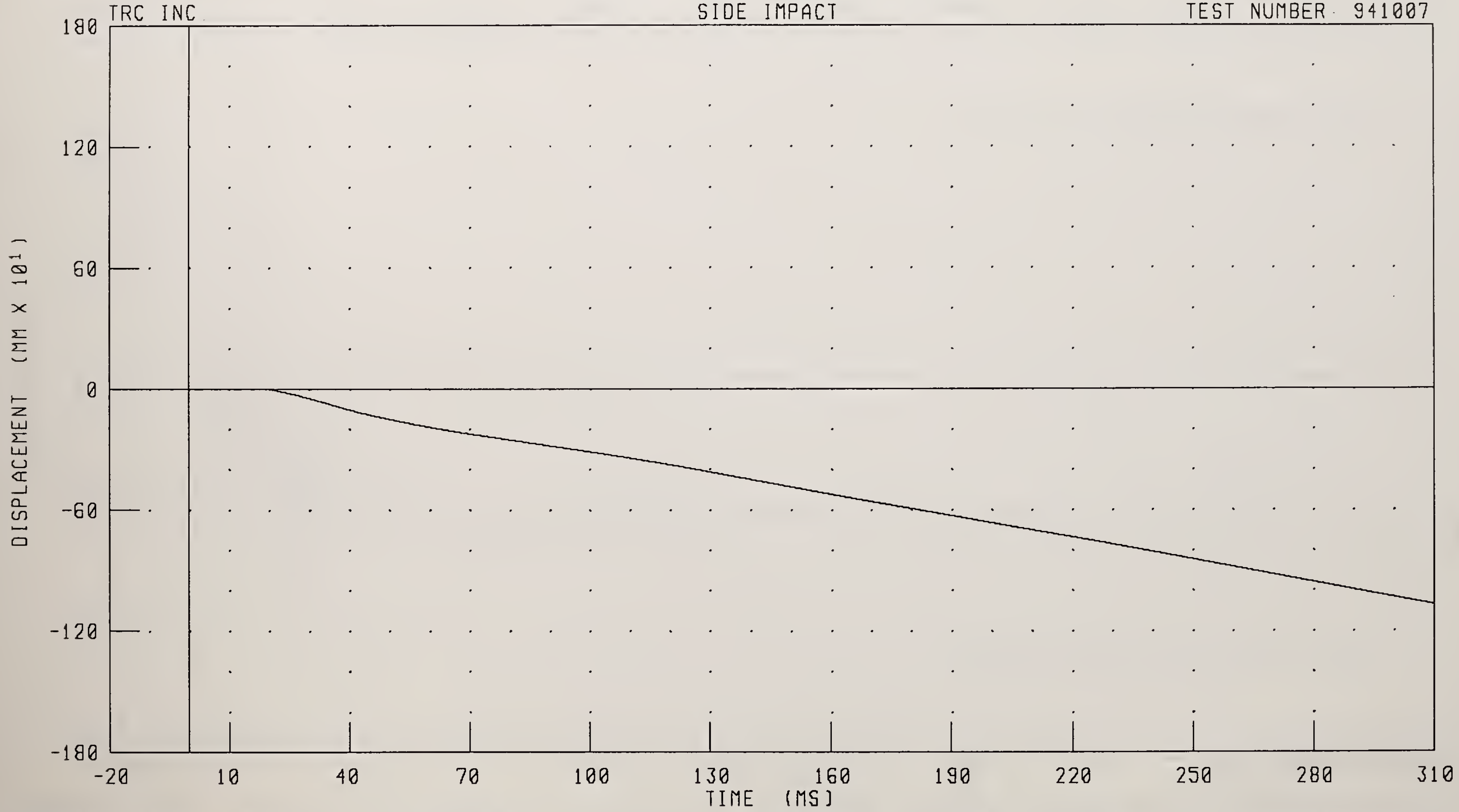
CHANNEL: TLRXG FILTER: CH. CLASS 60 PEAK DATA: 23.03 G @ 44.80 MS; -112.41 G @ 19.44 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT X-AXIS VELOCITY
SIDE IMPACT



CHANNEL: TLRXV FILTER: CH. CLASS 180 PEAK DATA: 2.73 KM/H @ 10.08 MS; -20.96 KM/H @ 36.40 MS

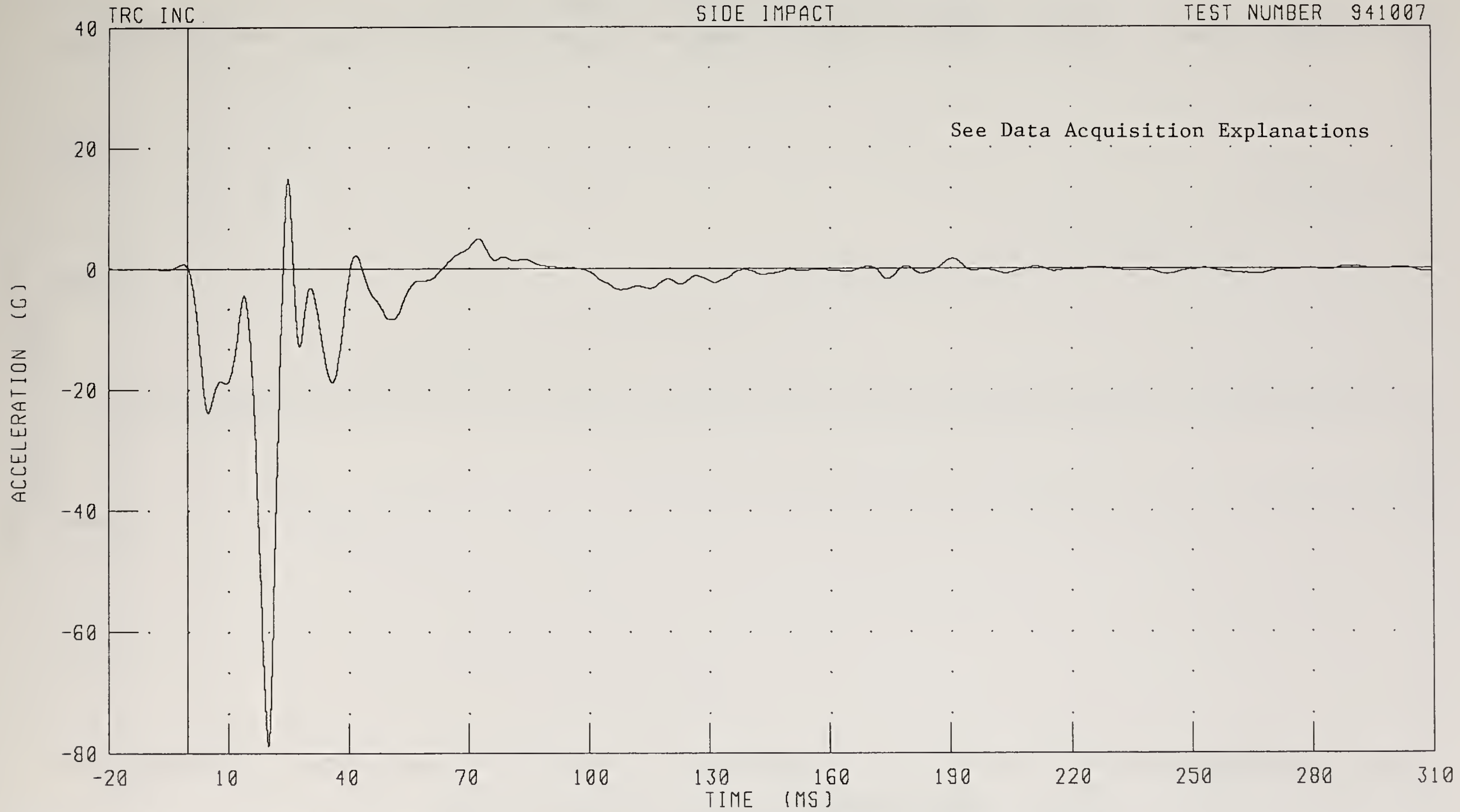
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT X-AXIS DISPLACEMENT



CHANNEL: TLRXD FILTER: CH. CLASS 180

PEAK DATA: 2.29 MM @ 11.76 MS; -1070.98 MM @ 310.00 MS

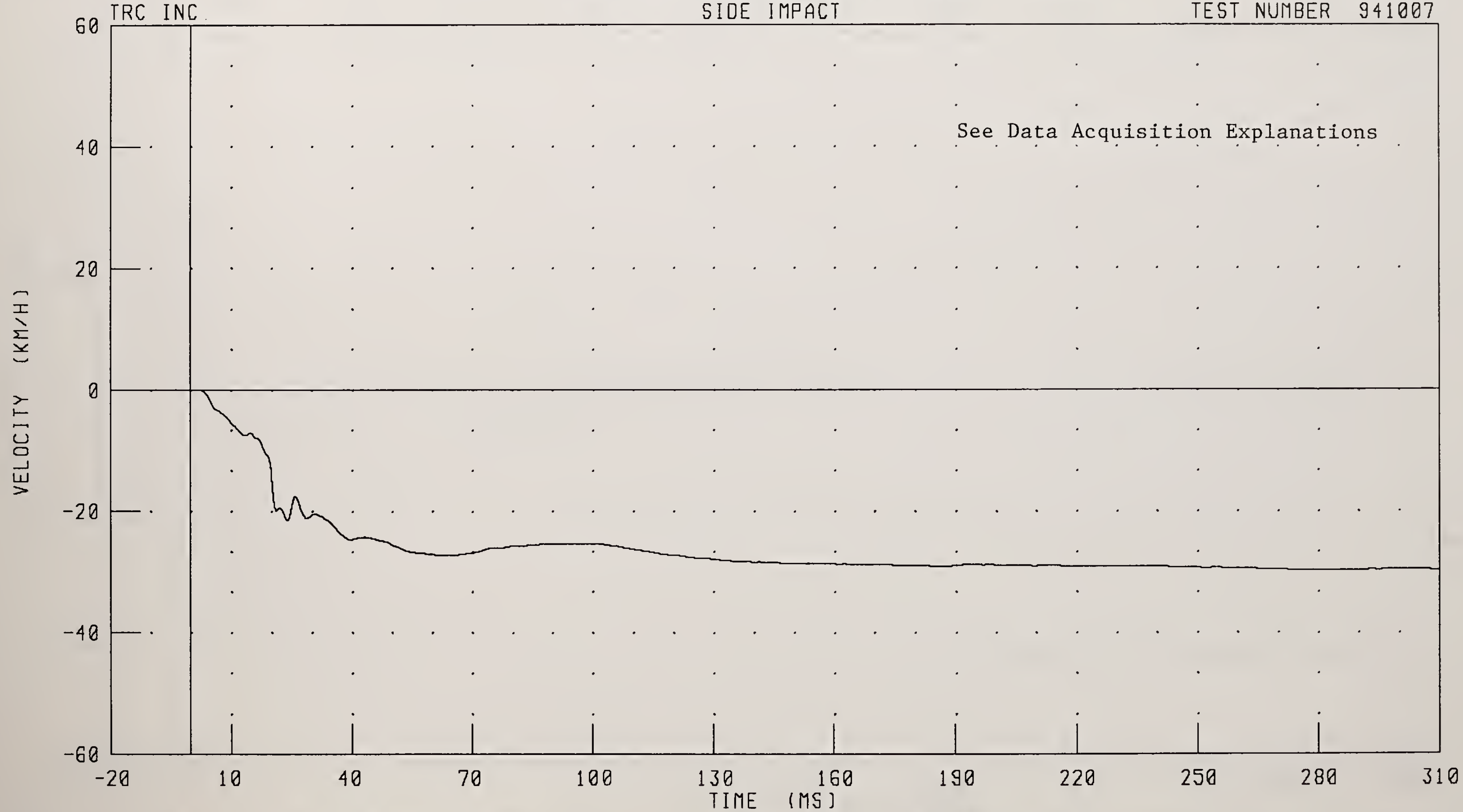
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT Y-AXIS ACCELERATION



CHANNEL: TLRYG FILTER: CH. CLASS 60

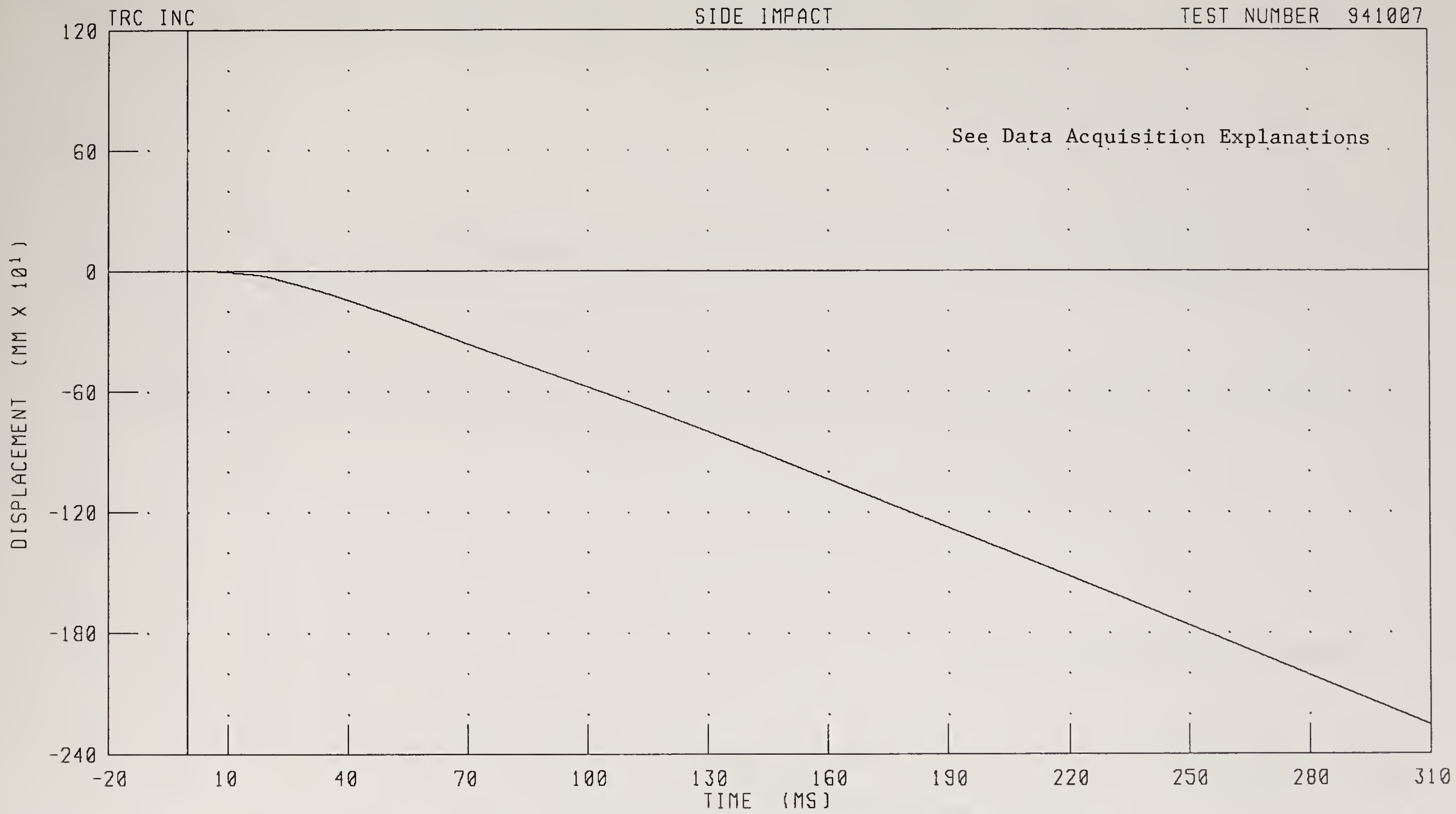
PEAK DATA: 14.83 G @ 24.88 MS; -78.73 G @ 20.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT Y-AXIS VELOCITY



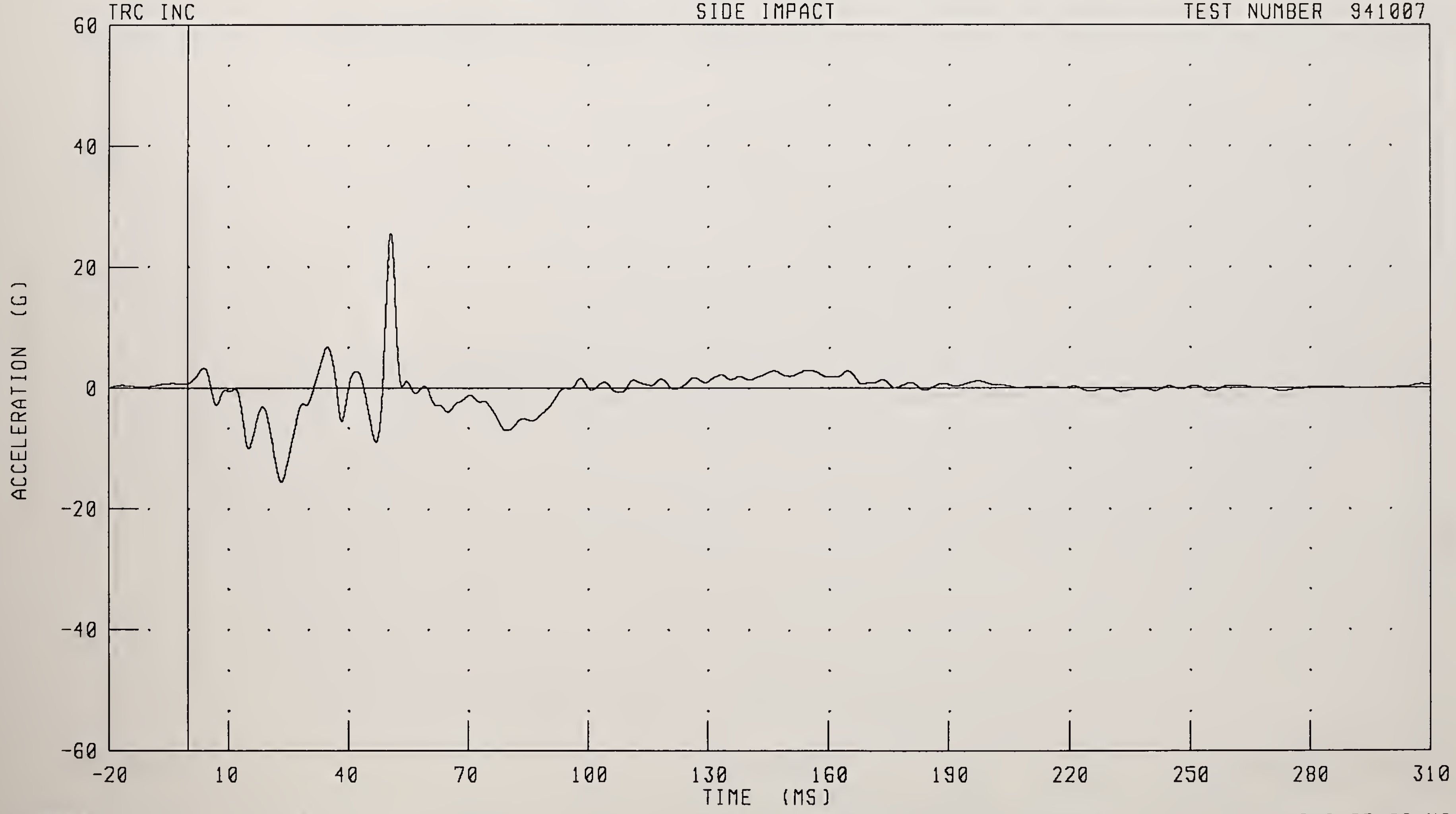
CHANNEL: TLRYV FILTER: CH. CLASS 180 PEAK DATA: 0.01 KM/H @ 1.52 MS; -29.79 KM/H @ 286.64 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
LEFT REAR SEAT Y-AXIS DISPLACEMENT



CHANNEL: TLRYD FILTER: CH. CLASS 180 PEAK DATA: 0 00 MM @ 2.08 MS; -2255 83 MM @ 310 00 MS

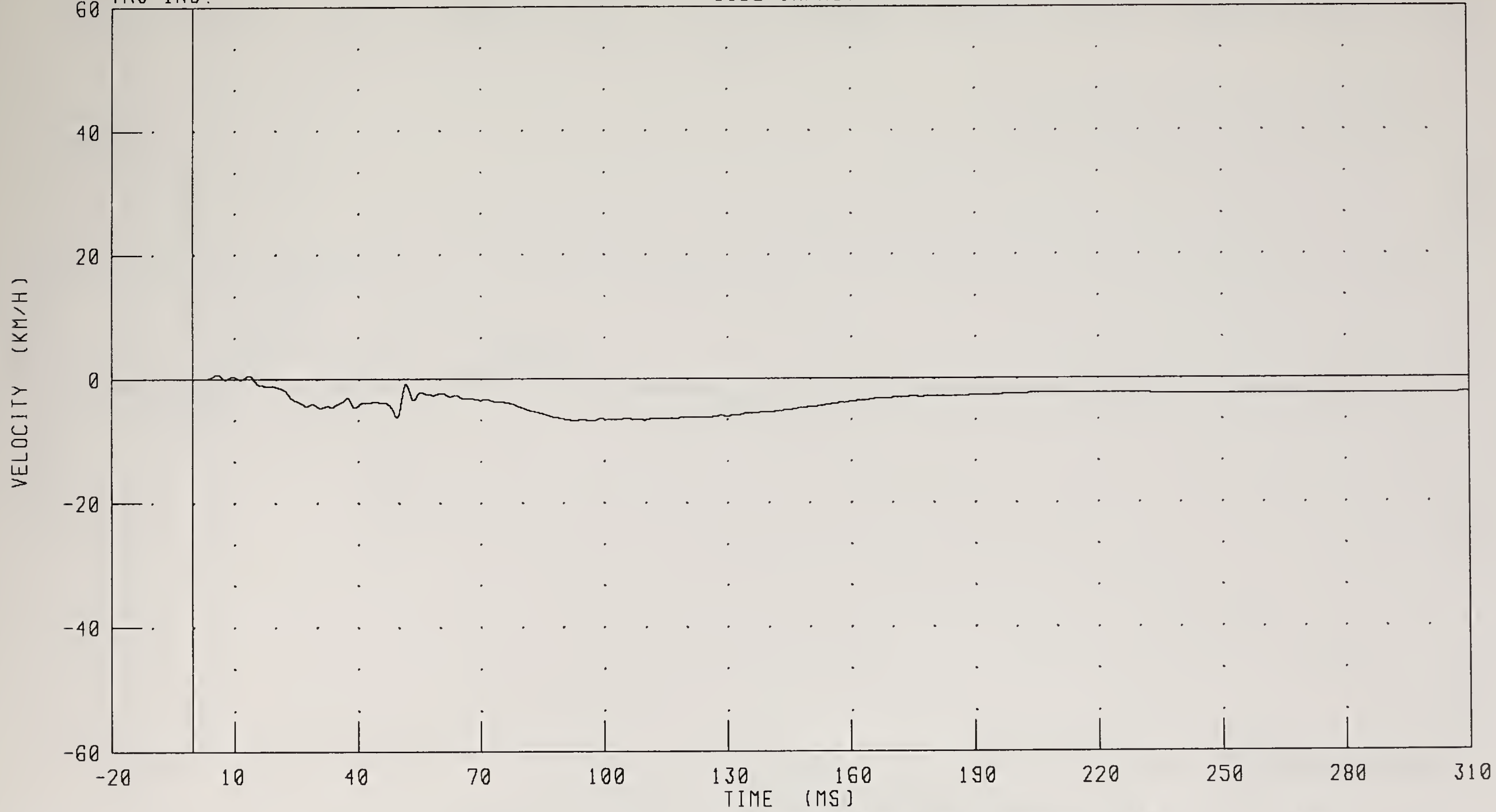
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT X-AXIS ACCELERATION



CHANNEL: TRRXG FILTER: CH. CLASS 60 PEAK DATA: 25.58 G @ 50.64 MS; -15.55 G @ 23.28 MS

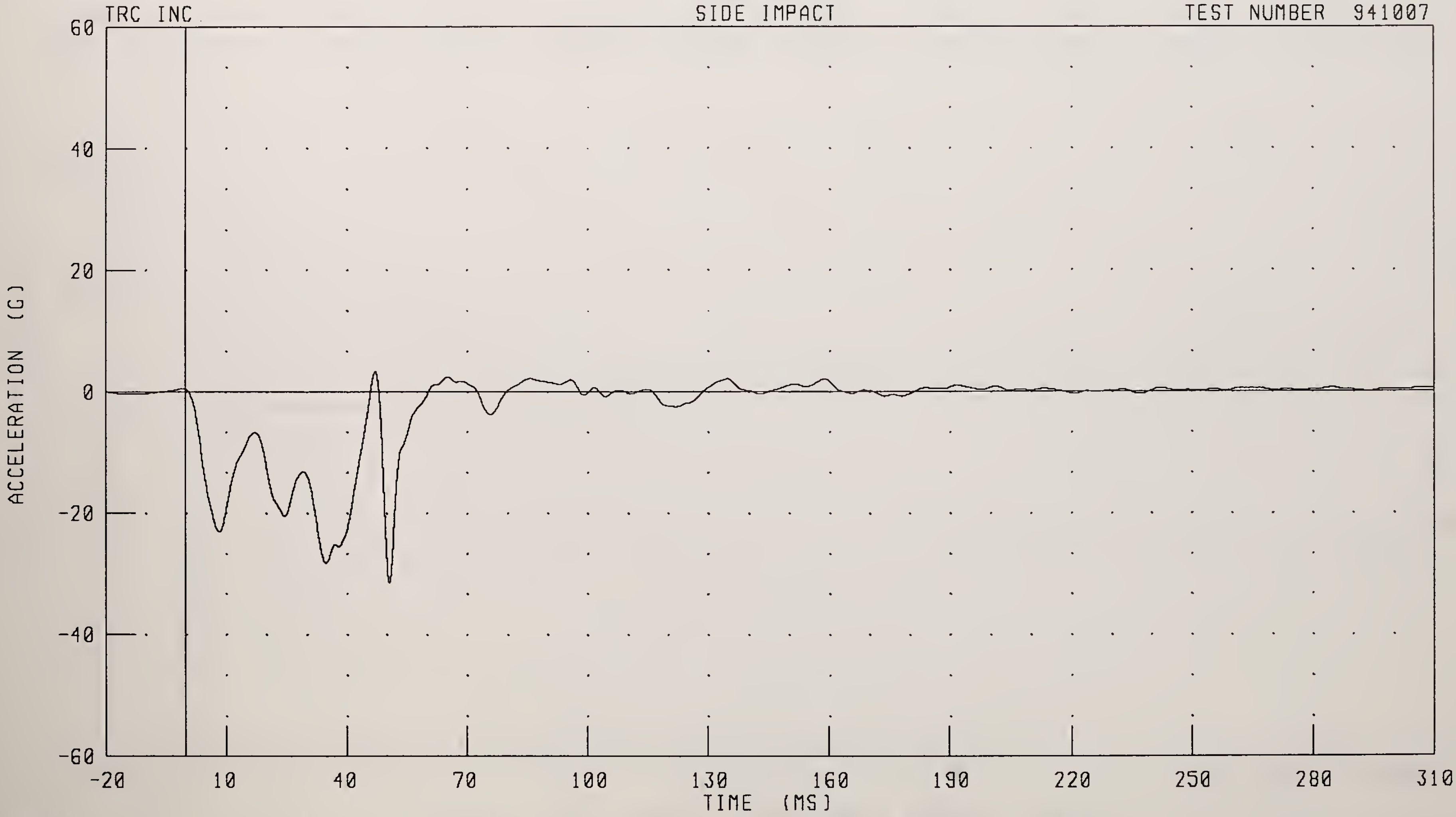
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT X-AXIS VELOCITY

TRC INC. SIDE IMPACT TEST NUMBER 941007



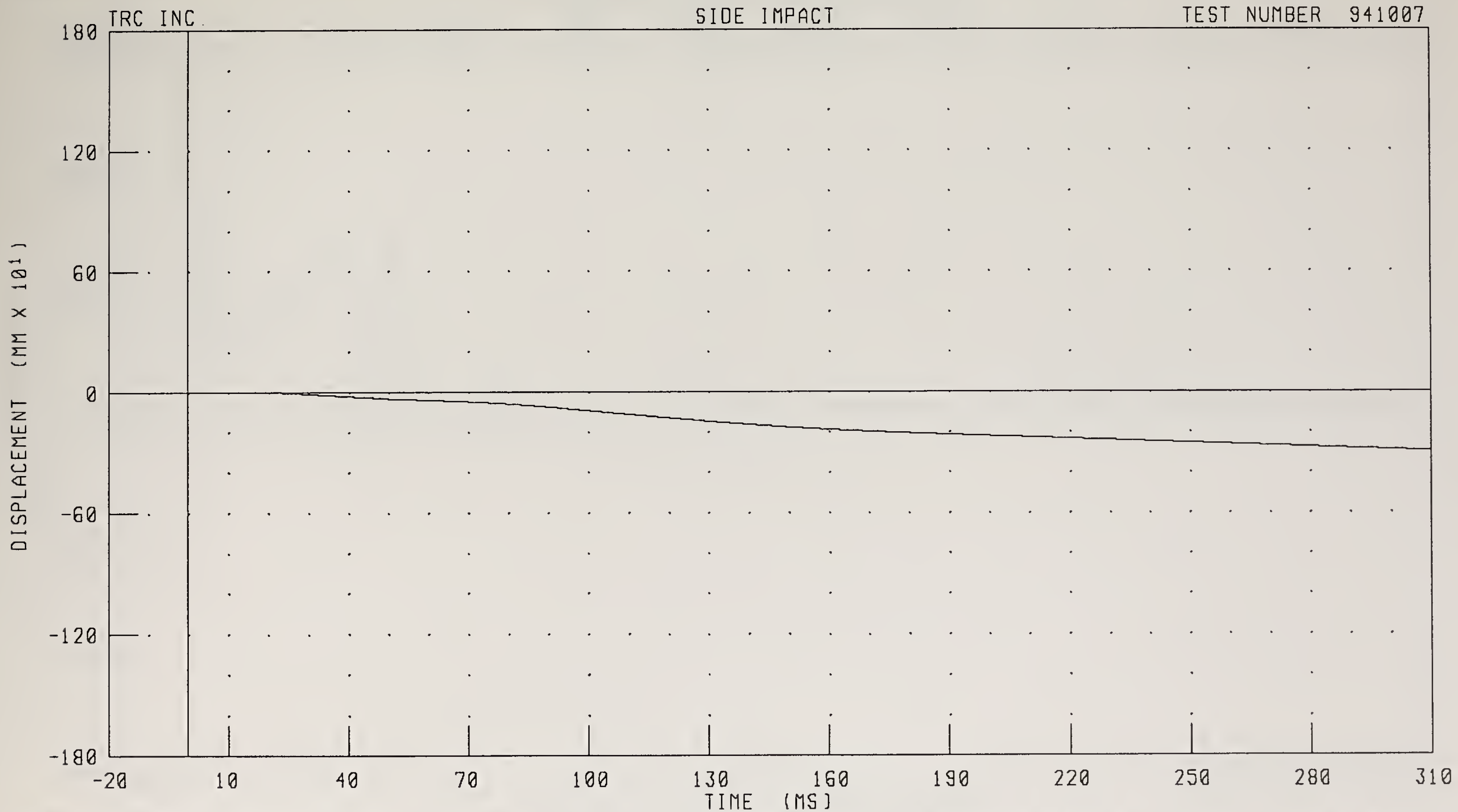
CHANNEL: TRRXV FILTER: CH. CLASS 180 PEAK DATA: 0.77 KM/H @ 5.84 MS; -6.82 KM/H @ 97.12 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT Y-AXIS ACCELERATION



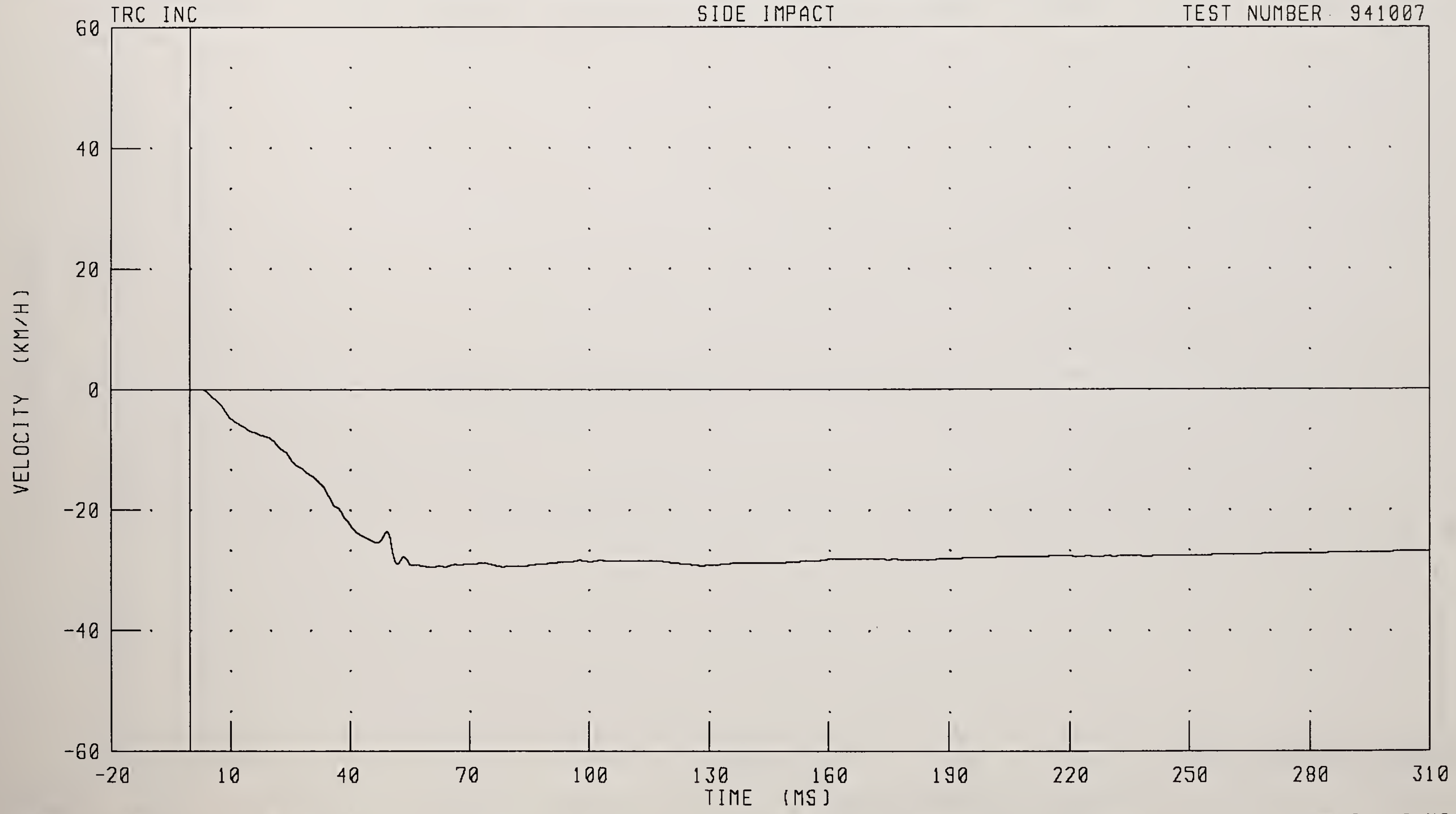
CHANNEL: TRRYG FILTER: CH. CLASS 60 PEAK DATA: 3.37 G @ 47.12 MS; -31.45 G @ 50.64 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT X-AXIS DISPLACEMENT



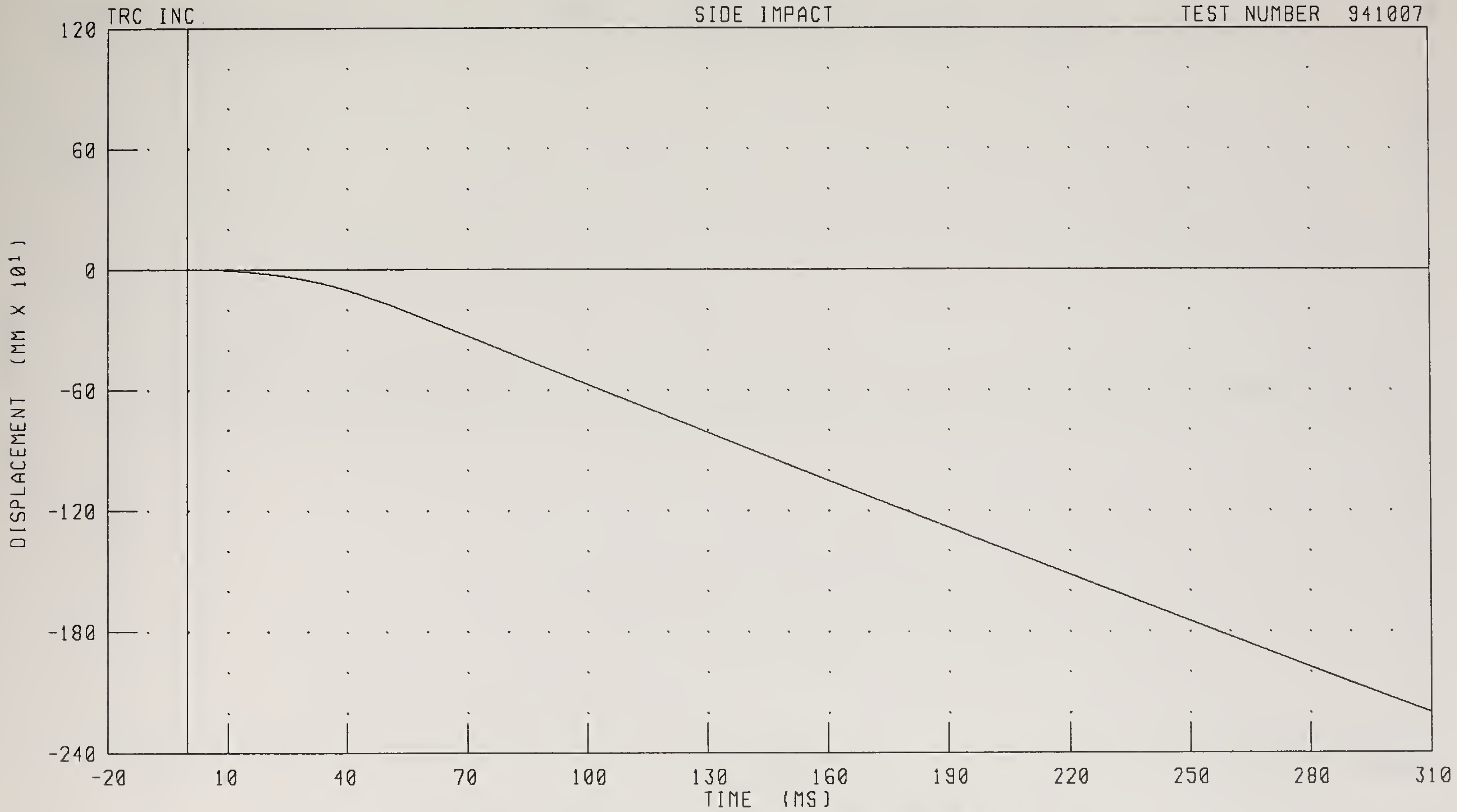
CHANNEL: TRRXD FILTER: CH. CLASS 180 PEAK DATA: 0.87 MM @ 14.64 MS; -295.89 MM @ 310.00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT Y-AXIS VELOCITY



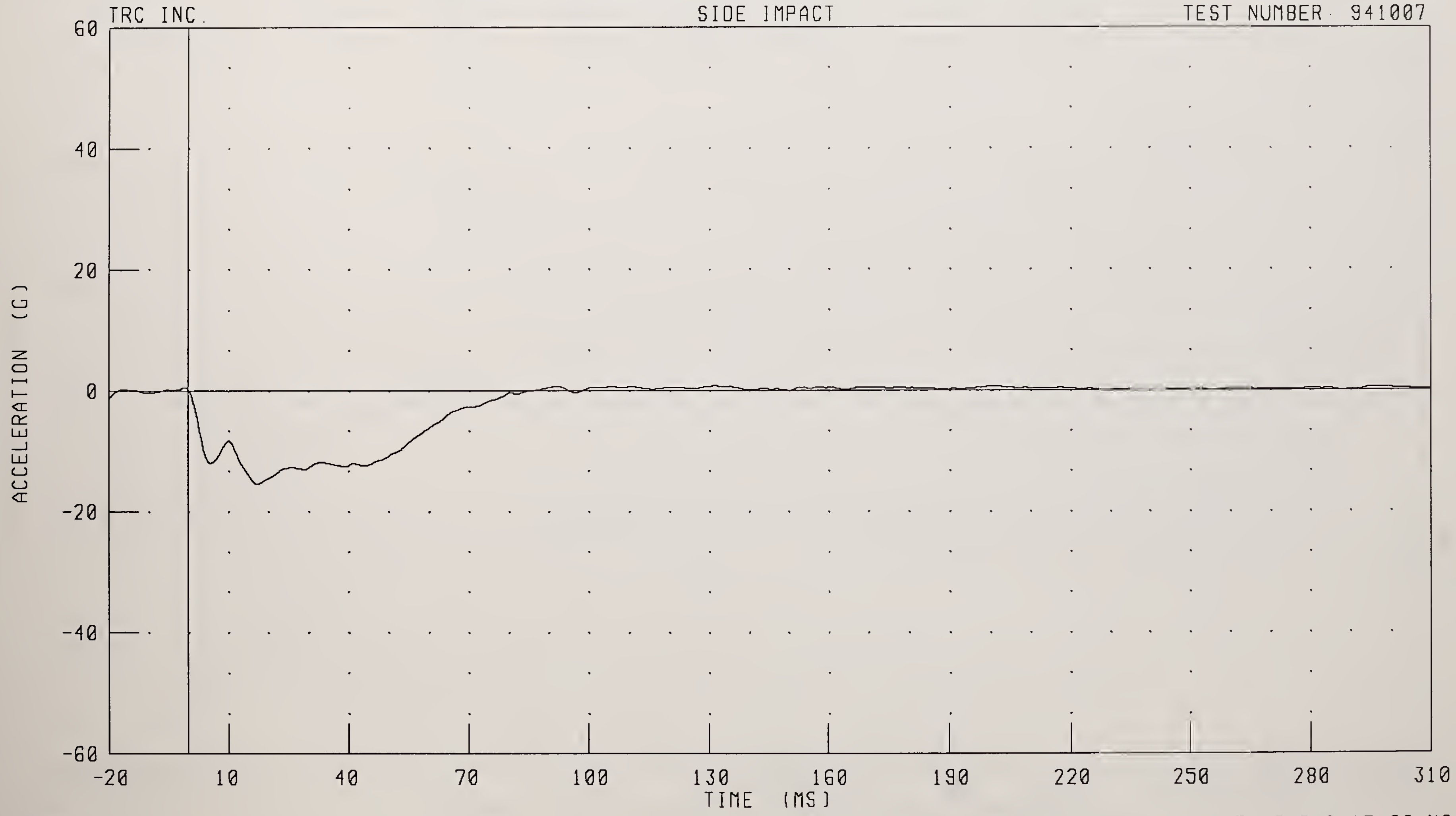
CHANNEL: TRRYV FILTER: CH. CLASS 180 PEAK DATA: 0.00 KM/H @ 0.00 MS; -29.53 KM/H @ 60.48 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
RIGHT REAR SEAT Y-AXIS DISPLACEMENT



CHANNEL: TRRYD FILTER: CH. CLASS 180 PEAK DATA: 0 00 MM @ 0 00 MS; -2201 49 MM @ 310 00 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY X-AXIS ACCELERATION



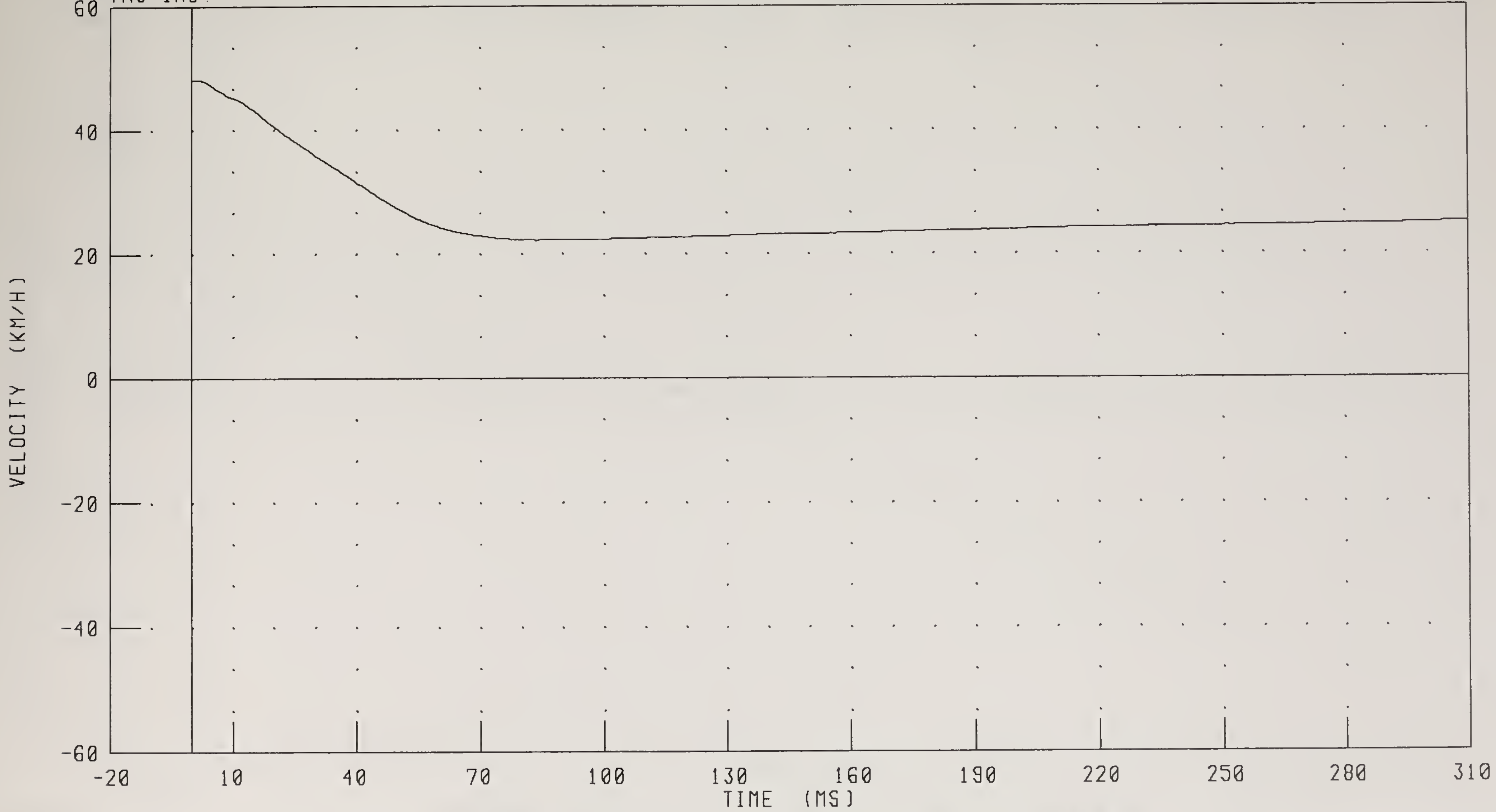
CHANNEL: BCGXG FILTER: CH. CLASS 60 PEAK DATA: 0.80 G @ 131.36 MS; -15 46 G @ 17 28 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY X-AXIS VELOCITY

TRC INC.

SIDE IMPACT

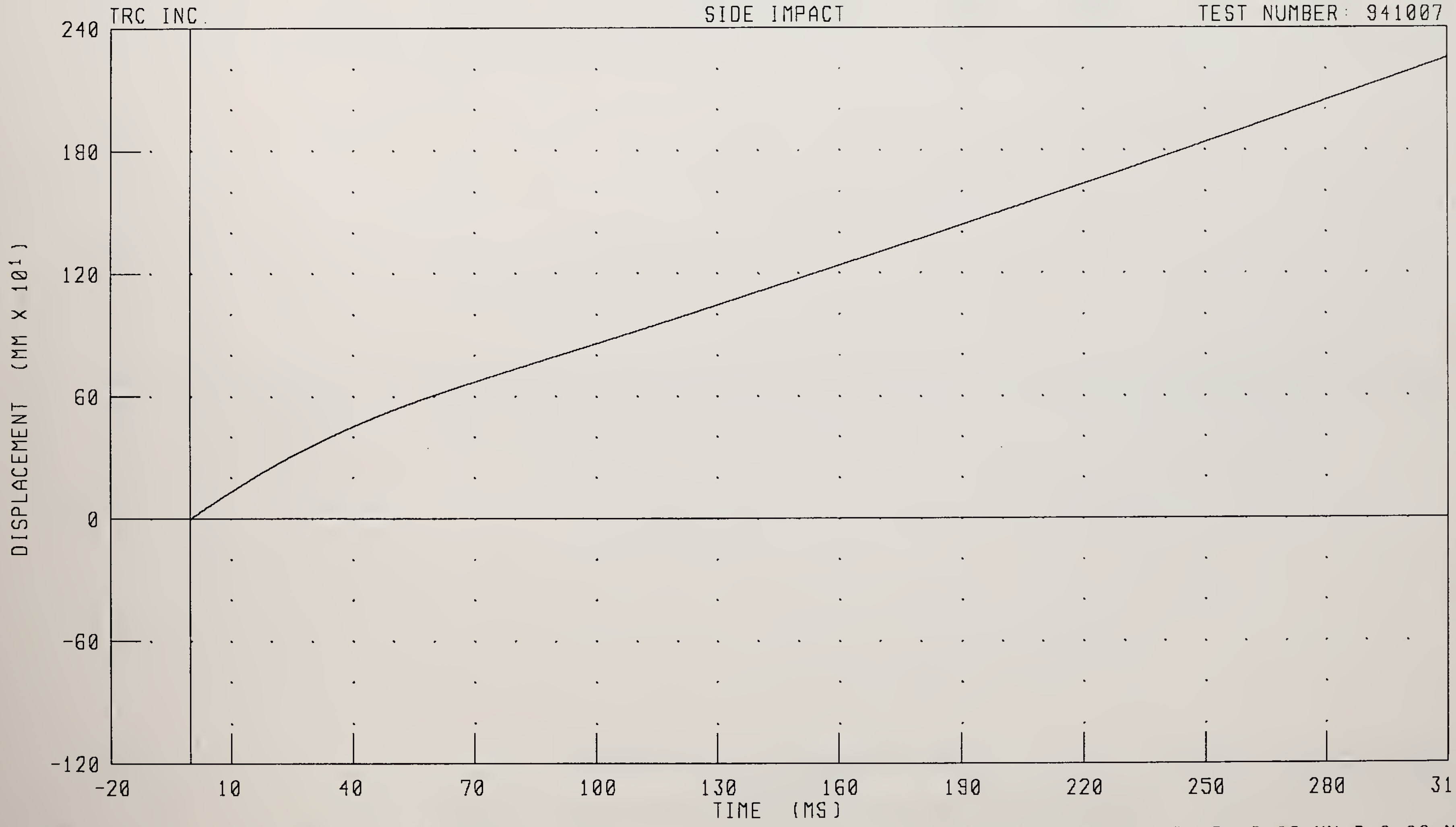
TEST NUMBER 941007



CHANNEL: BCGXV FILTER: CH. CLASS 180

PEAK DATA: 48.13 KM/H @ 0.80 MS; 22.27 KM/H @ 83.60 MS

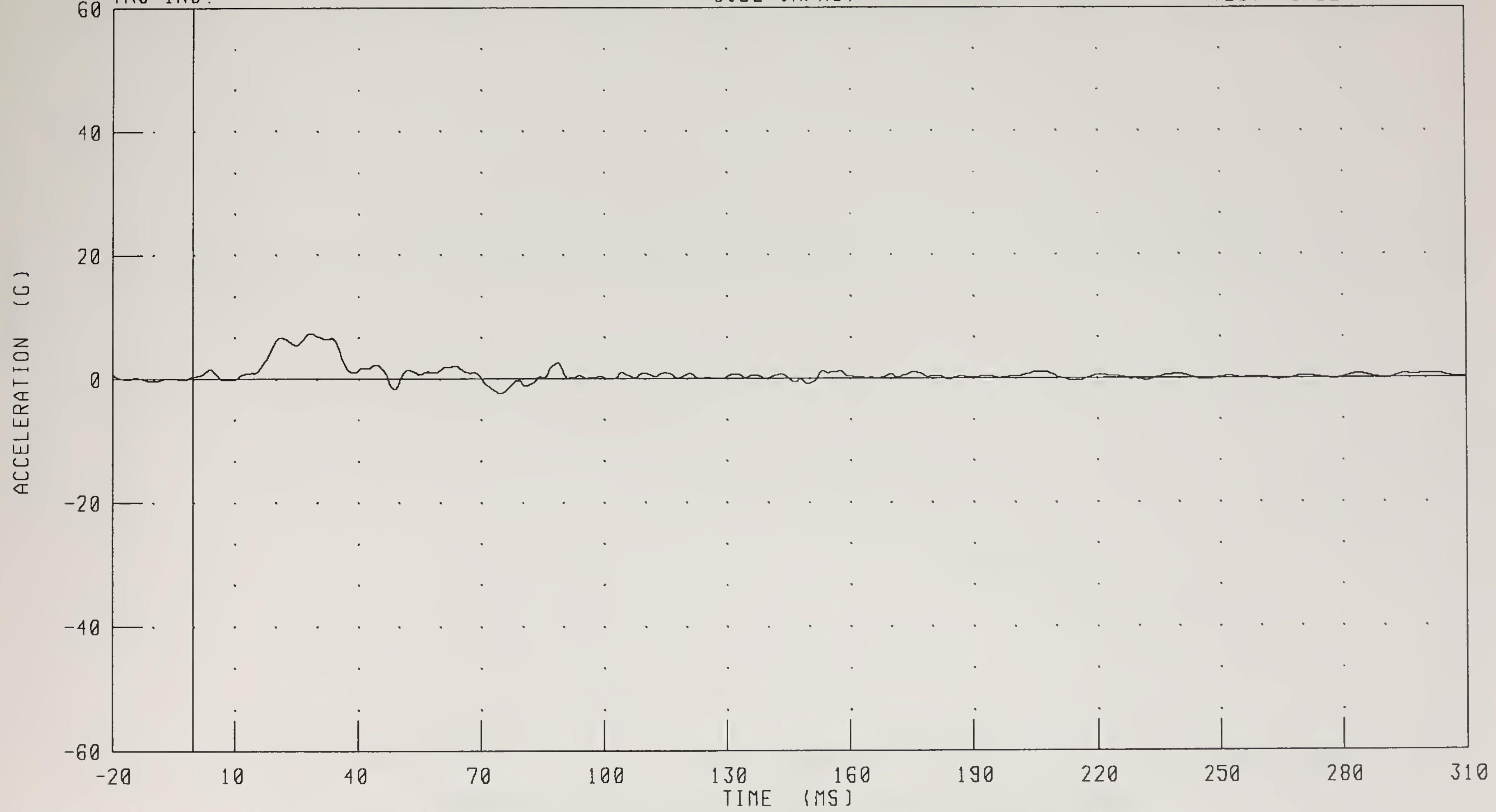
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY X-AXIS DISPLACEMENT



CHANNEL: BCGXD FILTER: CH. CLASS 180 PEAK DATA: 2249.94 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

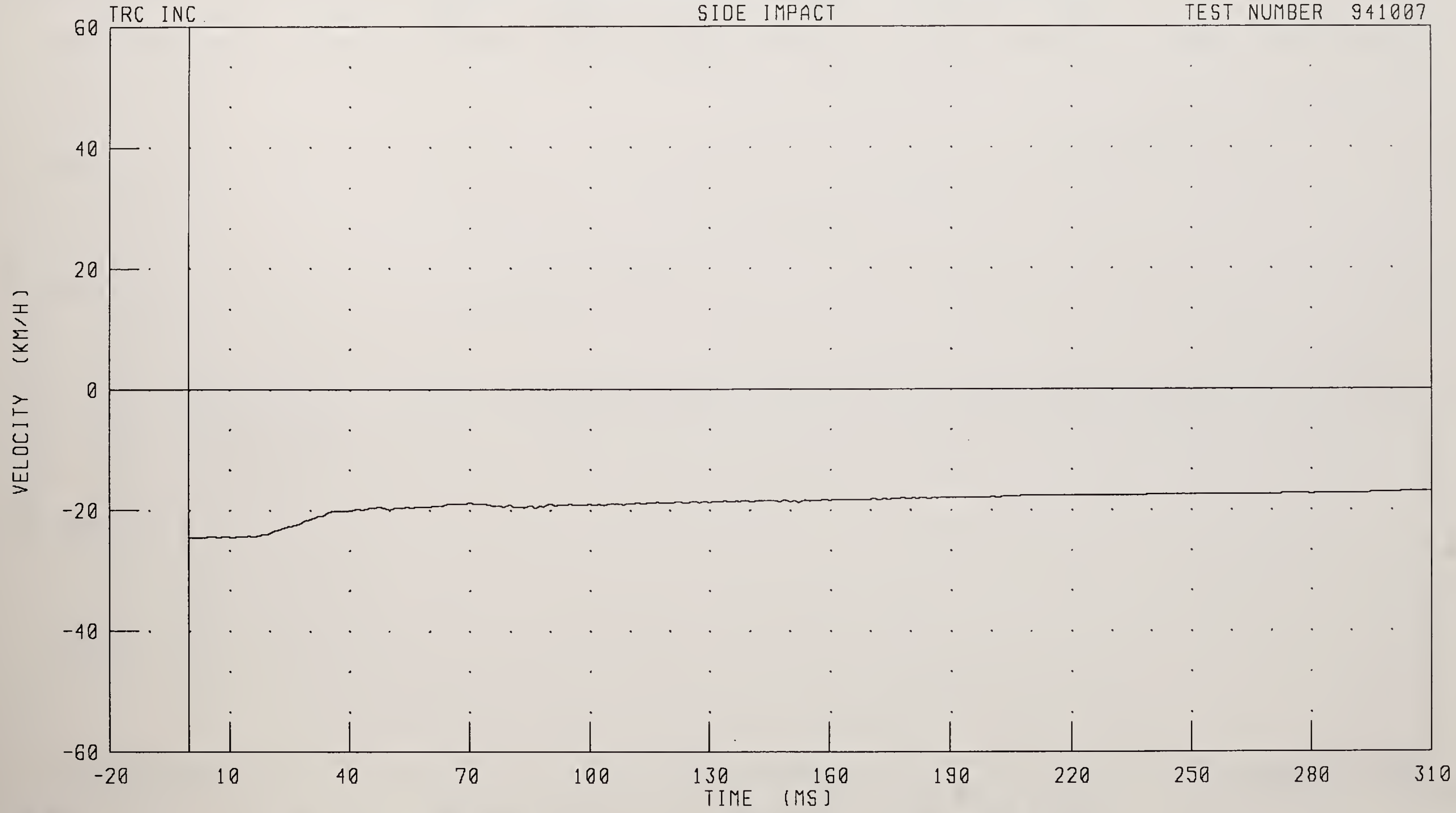
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Y-AXIS ACCELERATION

TRC INC. SIDE IMPACT TEST NUMBER 941007



CHANNEL: BCGYG FILTER: CH. CLASS 60 PEAK DATA: 7.37 G @ 28.56 MS; -2.37 G @ 74.80 MS

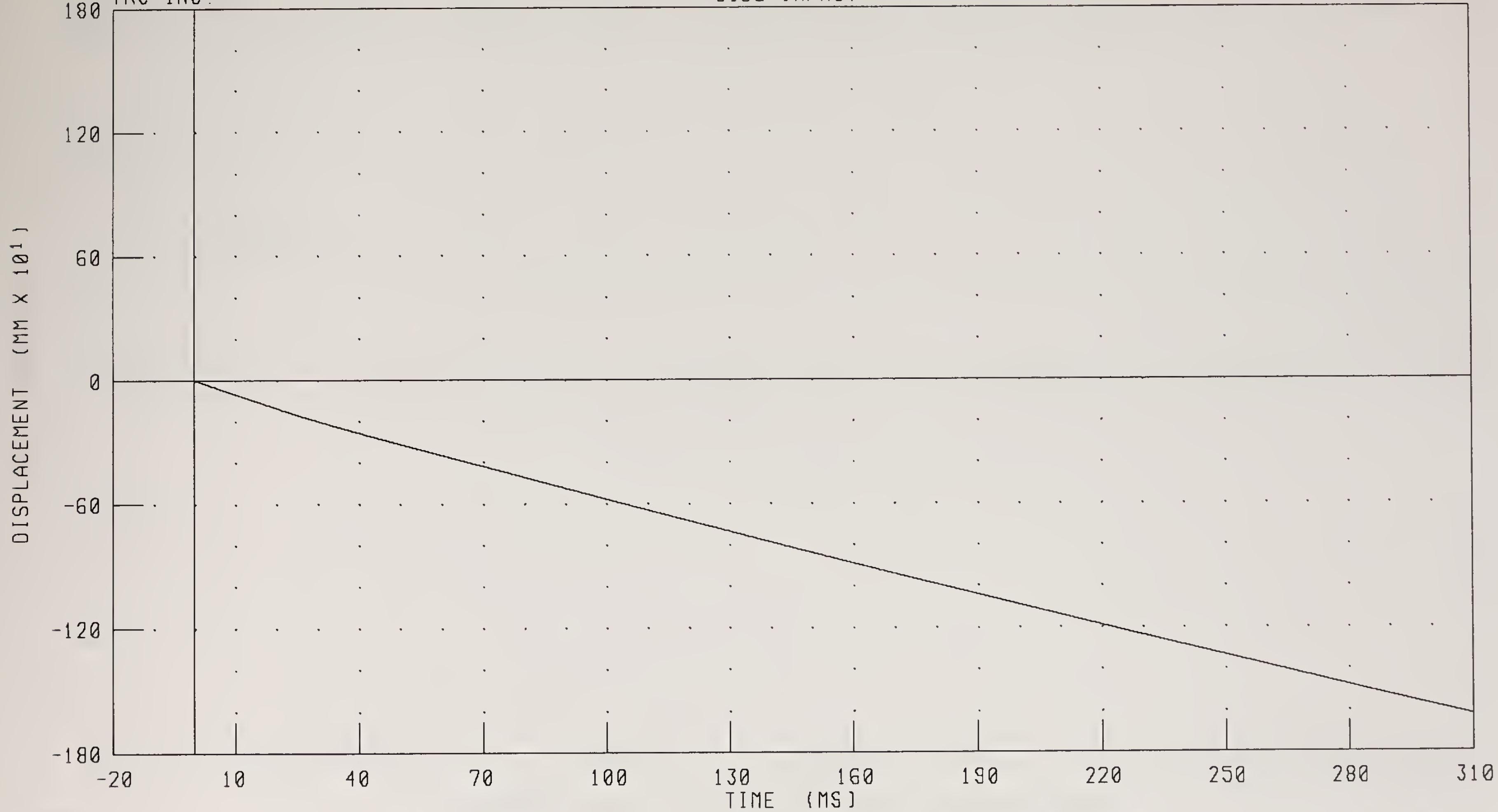
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Y-AXIS VELOCITY



CHANNEL: BCGYV FILTER: CH. CLASS 180 PEAK DATA: -16.90 KM/H @ 310.00 MS, -24.62 KM/H @ 3.12 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Y-AXIS DISPLACEMENT

TRC INC. SIDE IMPACT TEST NUMBER 941007

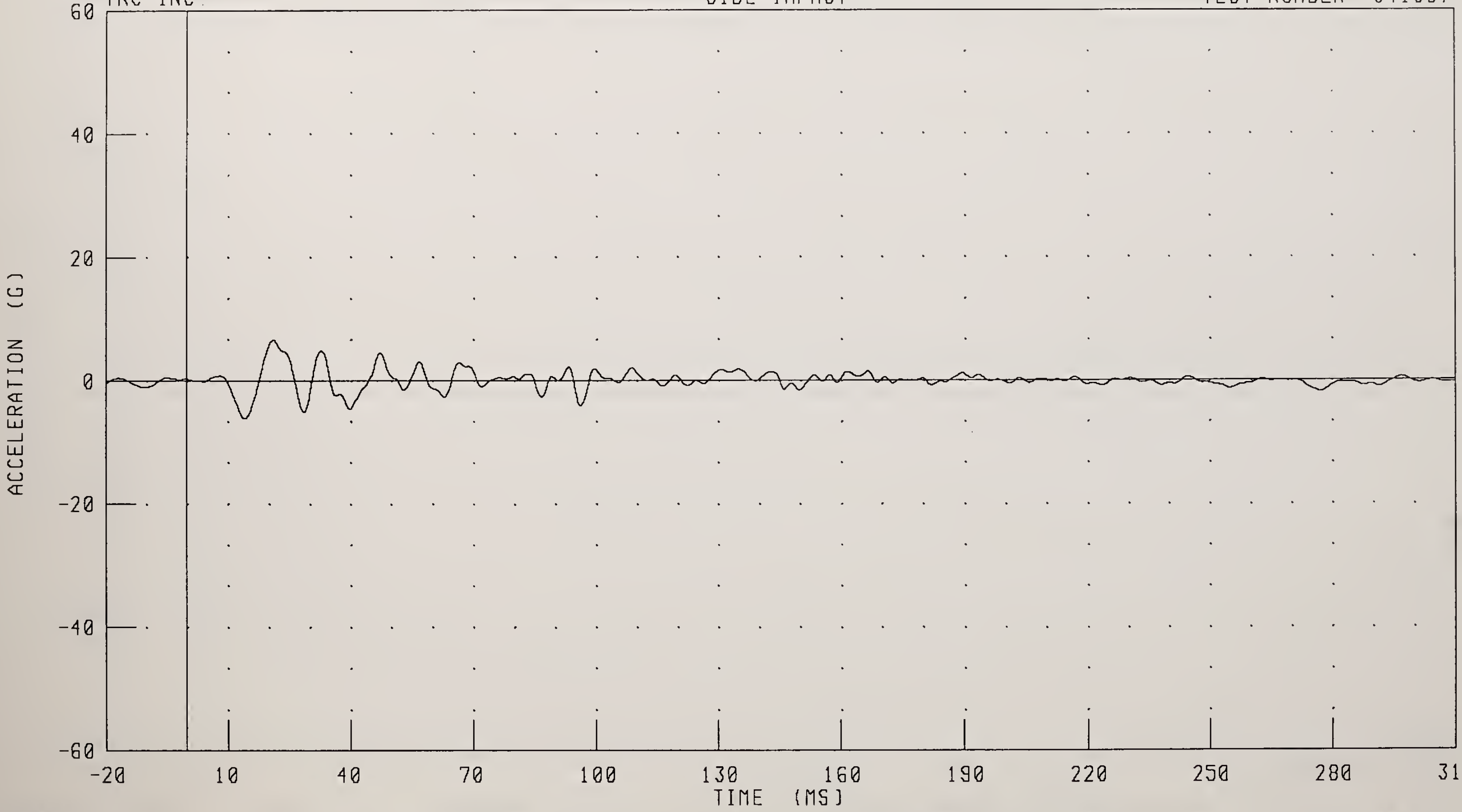


CHANNEL: BCGYD FILTER: CH. CLASS 180

PEAK DATA: 0.00 MM @ 0.00 MS; -1622.18 MM @ 310.00 MS

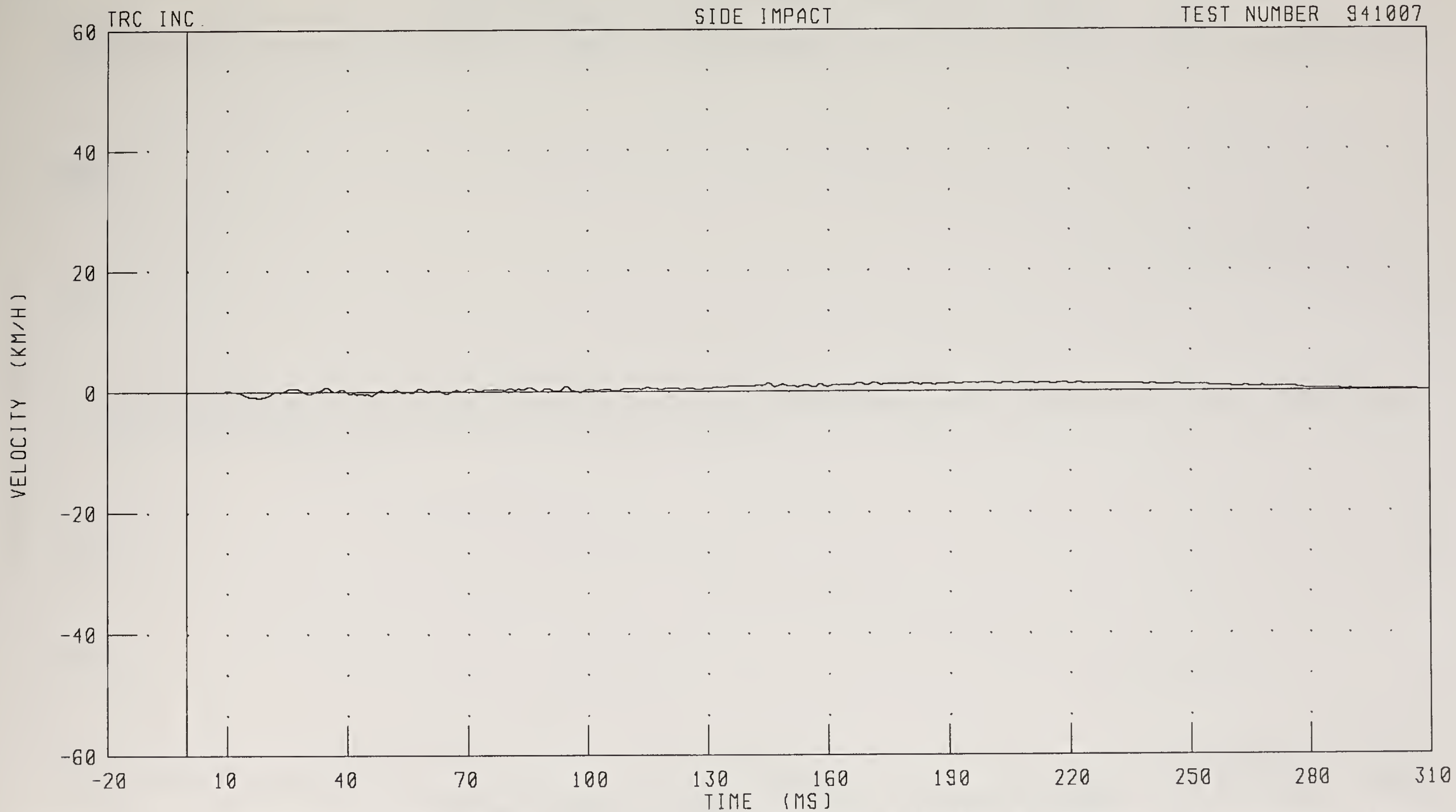
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Z-AXIS ACCELERATION

TRC INC. SIDE IMPACT TEST NUMBER 941007



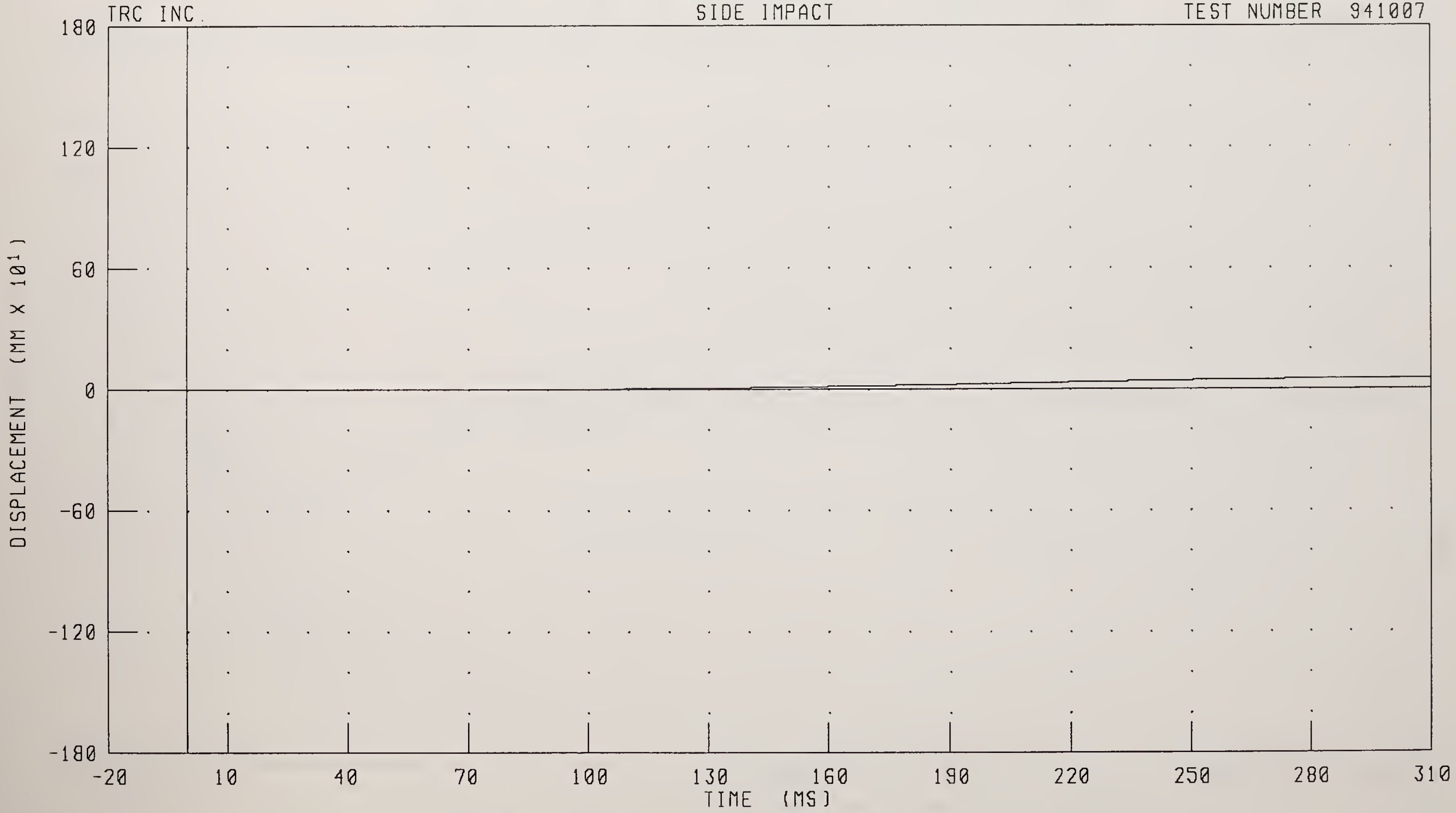
CHANNEL: BCGZG FILTER: CH. CLASS 60 PEAK DATA: 6.67 G @ 20.96 MS; -6.15 G @ 14.08 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Z-AXIS VELOCITY



CHANNEL: BCGZV FILTER: CH. CLASS 180 PEAK DATA: 1.42 KM/H @ 218.08 MS; -0.97 KM/H @ 18.00 MS

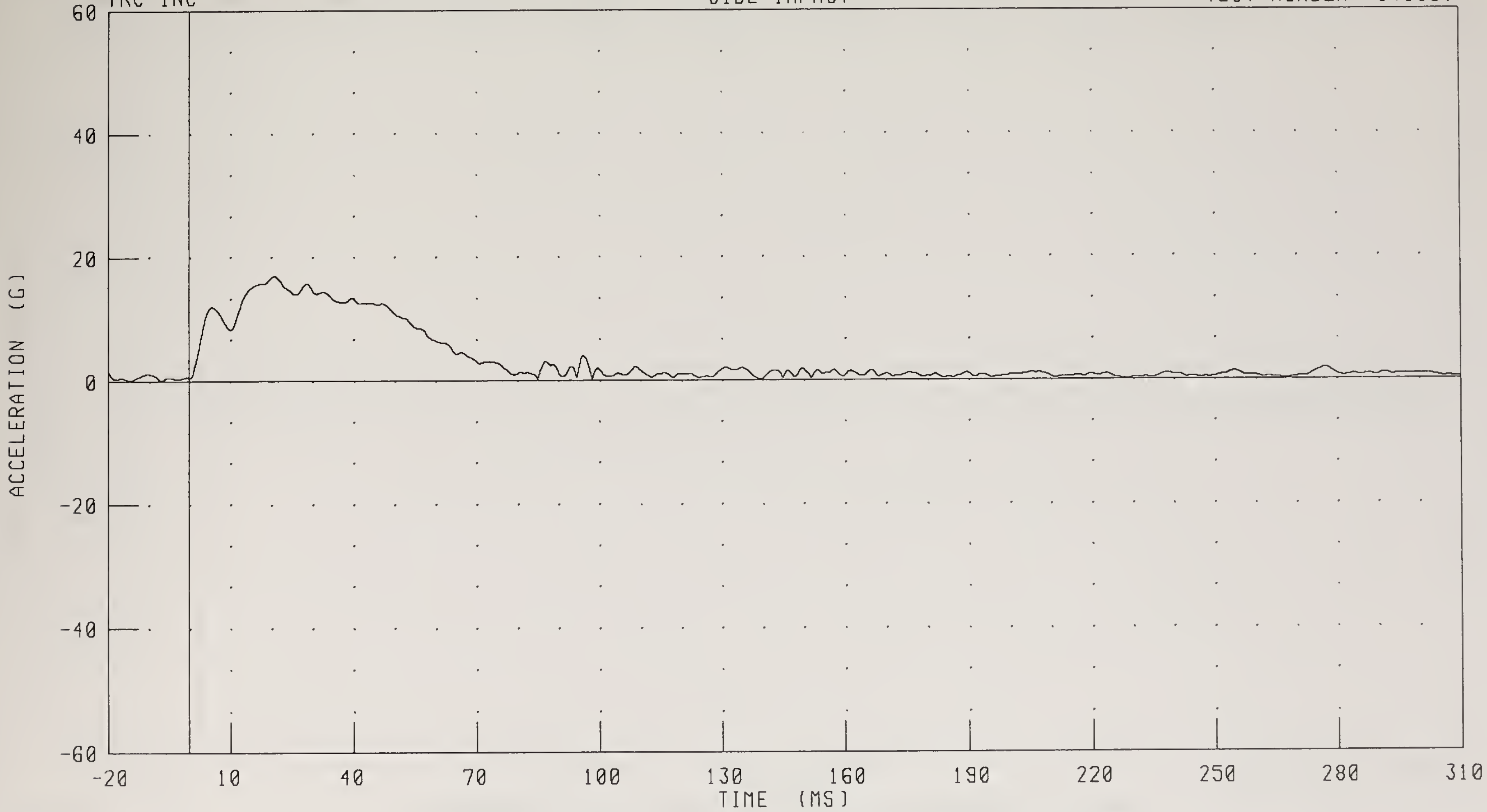
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY Z-AXIS DISPLACEMENT



CHANNEL: BCGZD FILTER: CH. CLASS 180 PEAK DATA: 51.24 MM @ 310.00 MS; -1.58 MM @ 23.92 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR CENTER OF GRAVITY RESULTANT ACCELERATION

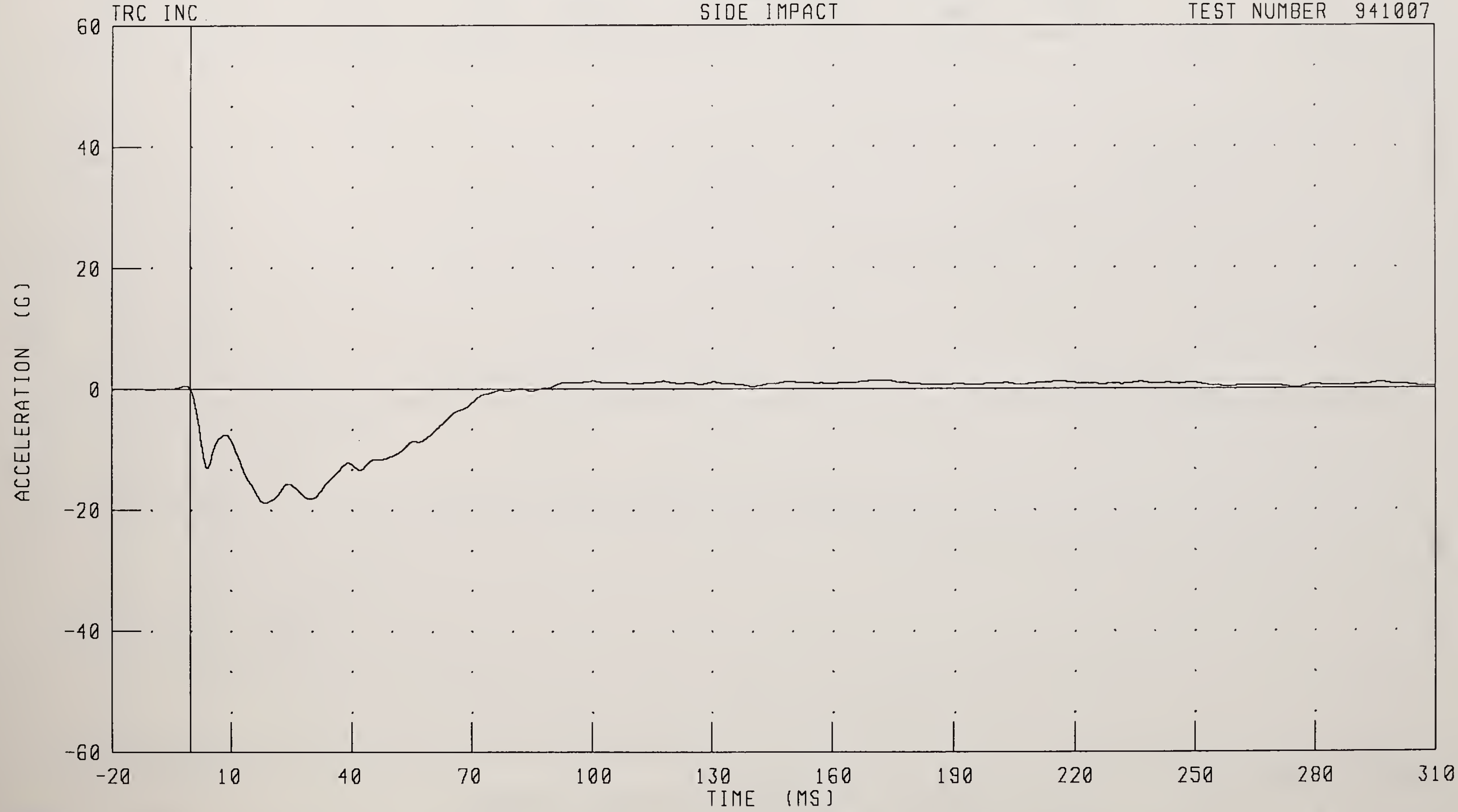
TRC INC
SIDE IMPACT
TEST NUMBER 941007



CHANNEL: BCGRG FILTER: CH CLASS 60

PEAK DATA 17.04 G @ 20.80 MS, 0.03 G @ -6.96 MS

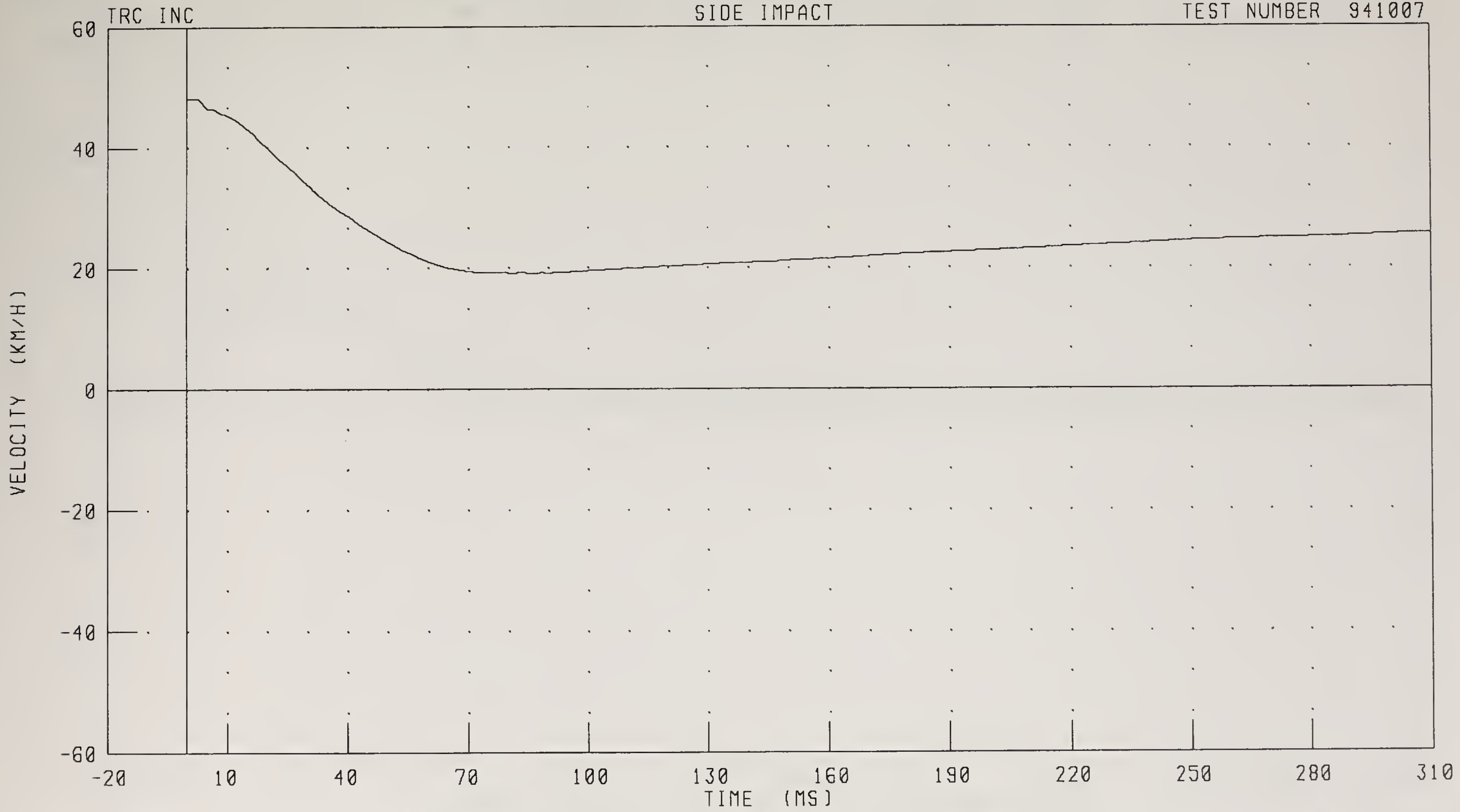
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL X-AXIS ACCELERATION



CHANNEL: BSRXG FILTER: CH. CLASS 60 PEAK DATA: 1.43 G @ 173.28 MS; -18.79 G @ 18.40 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL X-AXIS VELOCITY
SIDE IMPACT

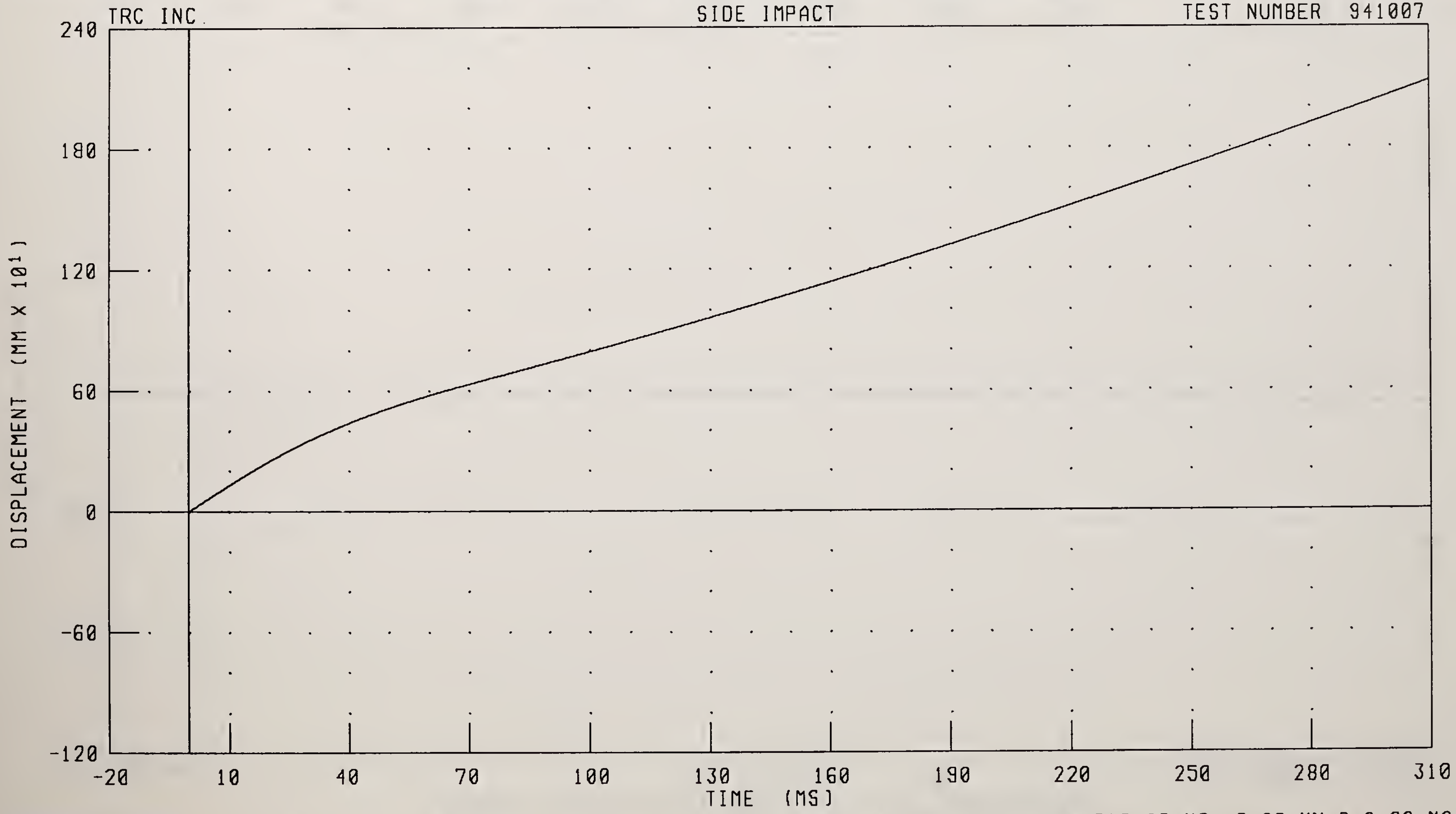
TEST NUMBER 941007



CHANNEL: BSRXV FILTER: CH. CLASS 180

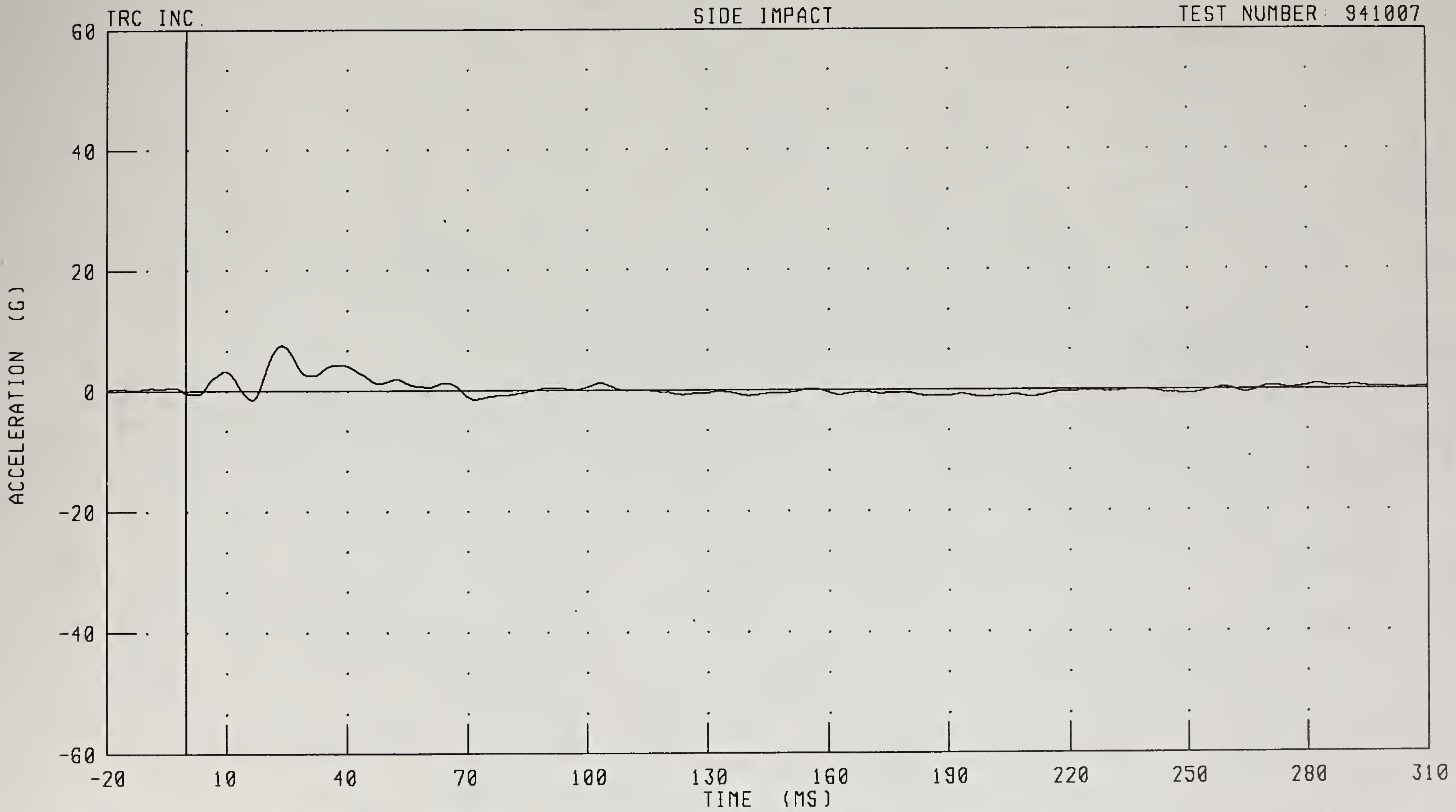
PEAK DATA: 48 12 KM/H @ 1 92 MS; 19 18 KM/H @ 86 08 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL X-AXIS DISPLACEMENT



CHANNEL: BSRXD FILTER: CH. CLASS 180 PEAK DATA: 2128.62 MM @ 310.00 MS; 0.00 MM @ 0.00 MS

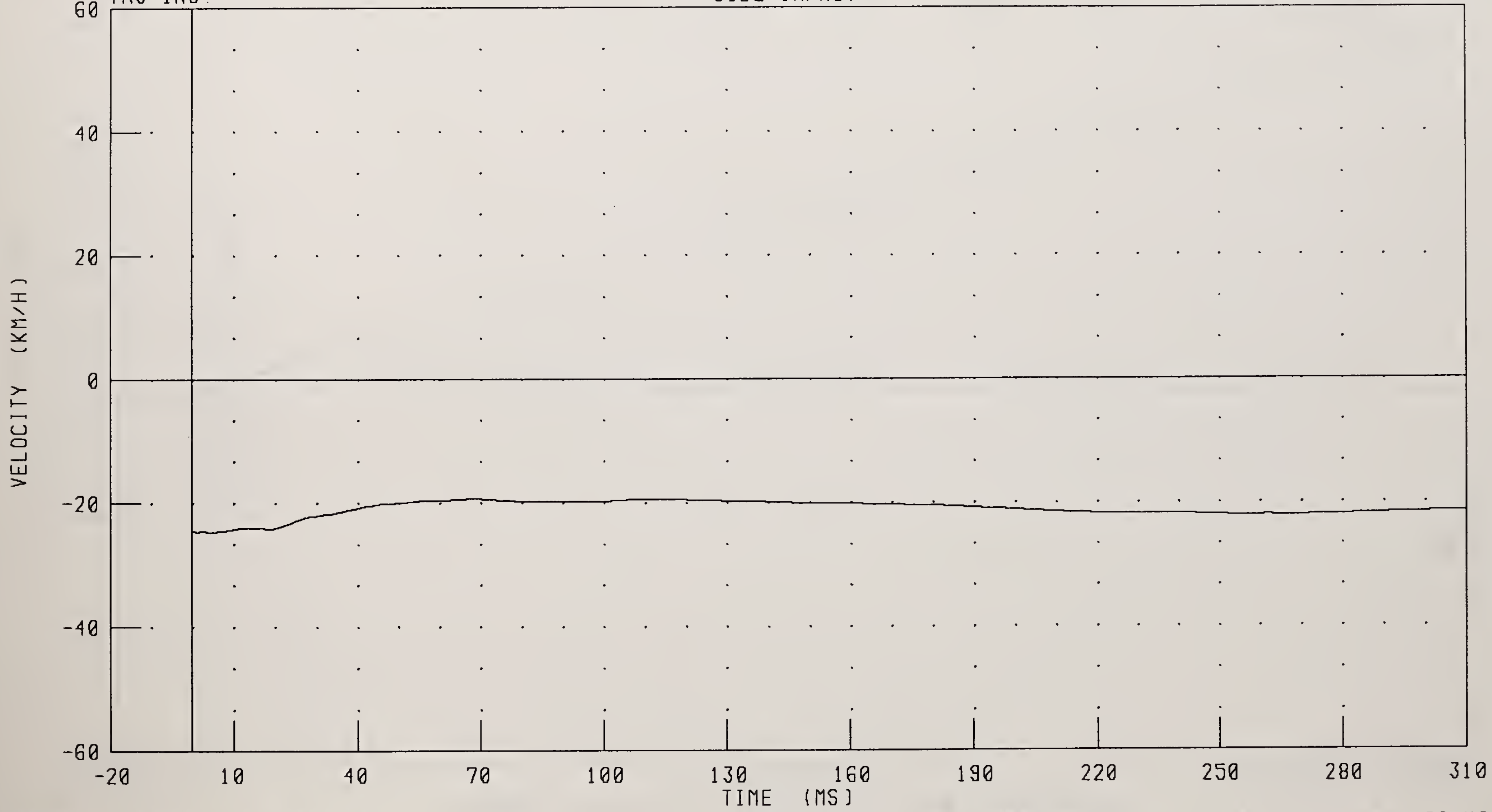
CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL Y-AXIS ACCELERATION



CHANNEL: BSRYG FILTER: CH. CLASS 60 PEAK DATA: 7.56 G @ 23.92 MS, -1.46 G @ 16.48 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL Y-AXIS VELOCITY

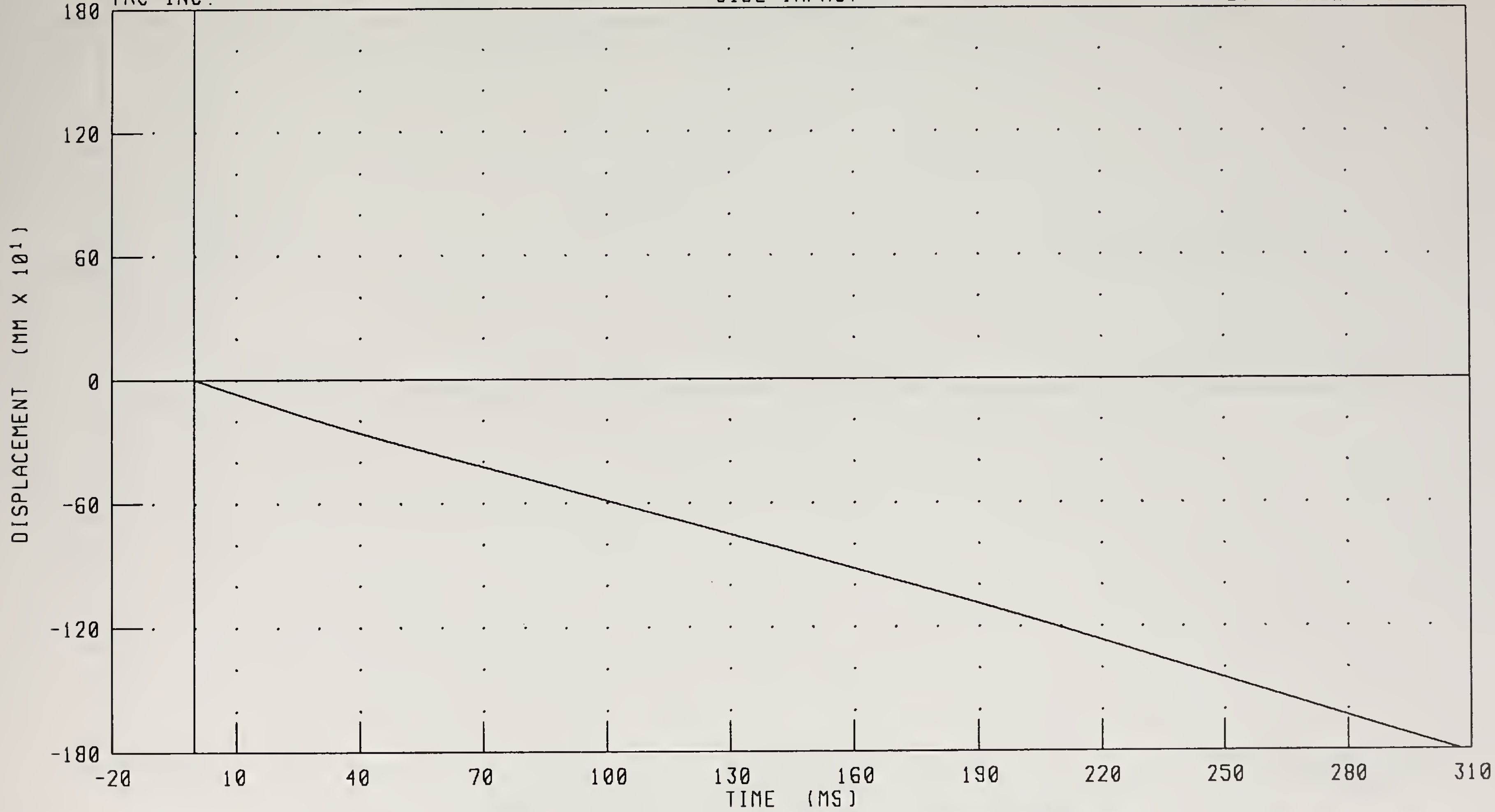
TRC INC. SIDE IMPACT TEST NUMBER 941007



CHANNEL: BSRYV FILTER: CH. CLASS 180 PEAK DATA: -19.31 KM/H @ 68.40 MS; -24.72 KM/H @ 4.88 MS

CRABBED IMPACTOR INTO LEFT SIDE OF 1988 FORD TAURUS
CRABBED IMPACTOR LEFT SIDE RAIL Y-AXIS DISPLACEMENT

TRC INC. SIDE IMPACT TEST NUMBER: 941007



CHANNEL: BSRYD FILTER: CH. CLASS 180 PEAK DATA: 0.00 MM @ 0.00 MS; -1813.70 MM @ 310.00 MS

Appendix C

Miscellaneous Test Information

Vehicle Accelerometer Information

No.	Location	Axis	Manufacturer	Model	Serial Number	Orientation (+ Sensing)
1	Vehicle Center of Gravity	X	Endevco	7264	FH41J	Front
		Y	Endevco	7264	CW87H	Left
		Z	Endevco	7264	CJ75H	Up
2	Left Front Sill	X	Endevco	7264	DW12J	Front
		Y	Endevco	7264	CR26HT	Right
3	Right Front Sill	X	Endevco	7264	CH74H	Front
		Y	Endevco	7264	BW77	Left
4	Left Rear Seat	X	Endevco	7264	CP90H	Front
		Y	Endevco	7264	CM27H	Right
5	Right Rear Seat	X	Endevco	7264	AGRF4	Front
		Y	Endevco	7264	DR49JT	Right

Crabbed Impactor Accelerometer Information

No.	Location	Axis	Manufacturer	Model	Serial Number	Orientation (+ Sensing)
1	Impactor Center of Gravity	X	Endevco	7264	CK65H	Front
		Y	Endevco	7264	CR83H	Left
		Z	Endevco	7264	DK26JT	Up
2	Impactor Left Side Rail	X	Endevco	7264	AT38	Front
		Y	Endevco	7264	BA46	Left

Sign Convention

All Dummy, Barrier, And Vehicle Channels:

+X: Forward

+Y: Leftward

+Z: Upward

+Force: Tension

DOT LIBRARY
00302587